Report No.: HTT202409755F04

TEST Report

Applicant:	YEAHER INC.
Address of Applicant:	51 Steel Dr,Unit A, New Castle,Delaware,19720
Manufacturer :	Nimo Direct Inc.
Address of Manufacturer :	51 Steel Dr,Unit A, New Castle,Delaware,19720

Equipment Under Test (EUT)

Product Name:	Portable Computer
Model No.:	N172S
Series model:	N172L, N172B
Trade Mark:	N/A
FCC ID:	2BEMH-N172S
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	Sep. 30, 2024
Date of Test:	Sep. 30, 2024 ~ Oct. 22, 2024
Date of report issued:	Oct. 22, 2024
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

1. Version

Version No.	Date	Description
00	*Oct. 22, 2024*	*Original*

Tested/ Prepared By	Heber He	***Date:***	***Oct. 22, 2024***
	Project Engineer		
Check By:	Bruce Zhu	***Date:***	***Oct. 22, 2024***
	Reviewer		
Approved By :	Kevin Yang	***Date:***	***Oct. 22, 2024***
	Authorized Signature		

2. Contents

Page

1. VERSION **2**

2. CONTENTS **3**

3. TEST SUMMARY **4**

4. GENERAL INFORMATION **5**

4.1. GENERAL DESCRIPTION OF EUT 5
4.2. TEST MODE 7
4.3. DESCRIPTION OF SUPPORT UNITS 7
4.4. DEVIATION FROM STANDARDS 7
4.5. ABNORMALITIES FROM STANDARD CONDITIONS 7
4.6. TEST FACILITY 7
4.7. TEST LOCATION 7
4.8. ADDITIONAL INSTRUCTIONS 7

5. TEST INSTRUMENTS LIST **7**

6. TEST RESULTS AND MEASUREMENT DATA **9**

6.1. CONDUCTED EMISSIONS 9
6.2. CONDUCTED PEAK OUTPUT POWER 12
6.3. CHANNEL BANDWIDTH 13
6.4. POWER SPECTRAL DENSITY 16
6.5. BAND EDGE 22
6.5.1. Conducted Emission Method *22*
6.5.2. Radiated Emission Method *27*
6.6. SPURIOUS EMISSION 29
6.6.1. Conducted Emission Method *29*
6.6.2. Radiated Emission Method *37*
6.7. ANTENNA REQUIREMENT 44

7. TEST SETUP PHOTO **45**

8. EUT CONSTRUCTIONAL DETAILS **45**

3. Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
6dB Bandwidth	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

Remark: Test according to ANSI C63.10:2013 and RSS-Gen

Pass: The EUT complies with the essential requirements in the standard.

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.37 dB	(1)
Radiated Emission	1~18GHz	5.40 dB	(1)
Radiated Emission	18-40GHz	5.45 dB	(1)
Conducted Disturbance	0.15~30MHz	2.68 dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

4. General Information

4.1. General Description of EUT

Product Name:	Portable Computer
Model No.:	N172S
Series model:	N172L, N172B
Test sample(s) ID:	HTT202409755-1(Engineer sample) HTT202409755-2(Normal sample)
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11 802.11n(HT40):7
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(H20)/802.11n(HT40): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	FPC Antenna
Antenna gain:	2.04 dBi for ANT 1 and -0.84 dBi for ANT 2
Directional gain	Directional gain =GANT + 10 log(NANT) dBi Directional gain=5.05dBi
Power Supply:	DC 11.4V From Battery and DC 20.0V From External Circuit
Adapter Information:	Model: A879-200500C-US1 Input: 100-240V~50/60Hz,2.5A Output: PD 5V⎓3A/9V⎓3A/12V⎓3A/15V⎓3A/20V⎓5A PPS 3.3-21V⎓5A 100W Max

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**	
	802.11b/802.11g/802.11n(HT20)	802.11n(HT40)
Lowest channel	2412MHz	2422MHz
Middle channel	2437MHz	2437MHz
Highest channel	2462MHz	2452MHz

4.2. Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13Mbps

4.3. Description of Support Units

None.

4.4. Deviation from Standards

None.

4.5. Abnormalities from Standard Conditions

None.

4.6. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 779513 Designation Number: CN1319
Shenzhen HTT Technology Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.
A2LA-Lab Cert. No.: 6435.01
Shenzhen HTT Technology Co.,Ltd. has been accredited by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

4.7. Test Location

All tests were performed at:

Shenzhen HTT Technology Co.,Ltd.
1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China
Tel: 0755-23595200
Fax: 0755-23595201

4.8. Additional Instructions

Test Software	Special AT test command provided by manufacturer to Keep the EUT in continuously transmitting mode and hopping mode
Power level setup	Default

5. Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory	Cal.Date	Cal.Due date

				No.	(mm-dd-yy)	(mm-dd-yy)
1	3m Semi- Anechoic Chamber	Shenzhen C.R.T technology co., LTD	9*6*6	HTT-E028	Aug. 10 2024	Aug. 09 2027
2	Control Room	Shenzhen C.R.T technology co., LTD	4.8*3.5*3.0	HTT-E030	Aug. 10 2024	Aug. 09 2027
3	EMI Test Receiver	Rohde&Schwar	ESCI7	HTT-E022	Apr. 26 2024	Apr. 25 2025
4	Spectrum Analyzer	Rohde&Schwar	FSP	HTT-E037	Apr. 26 2024	Apr. 25 2025
5	Coaxial Cable	ZDecl	ZT26-NJ-NJ-0.6M	HTT-E018	Apr. 26 2024	Apr. 25 2025
6	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-2M	HTT-E019	Apr. 26 2024	Apr. 25 2025
7	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-0.6M	HTT-E020	Apr. 26 2024	Apr. 25 2025
8	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-8.5M	HTT-E021	Apr. 26 2024	Apr. 25 2025
9	Composite logarithmic antenna	Schwarzbeck	VULB 9168	HTT-E017	May. 21 2024	May. 20 2025
10	Horn Antenna	Schwarzbeck	BBHA9120D	HTT-E016	May. 20 2024	May. 19 2025
11	Loop Antenna	Zhinan	ZN30900C	HTT-E039	Apr. 26 2024	Apr. 25 2025
12	Horn Antenna	Beijing Hangwei Dayang	OBH100400	HTT-E040	Apr. 26 2024	Apr. 25 2025
13	low frequency Amplifier	Sonoma Instrument	310	HTT-E015	Apr. 26 2024	Apr. 25 2025
14	high-frequency Amplifier	HP	8449B	HTT-E014	Apr. 26 2024	Apr. 25 2025
15	Variable frequency power supply	Shenzhen Anbiao Instrument Co., Ltd	ANB-10VA	HTT-082	Apr. 26 2024	Apr. 25 2025
16	EMI Test Receiver	Rohde & Schwarz	ESCS30	HTT-E004	Apr. 26 2024	Apr. 25 2025
17	Artificial Mains	Rohde & Schwarz	ESH3-Z5	HTT-E006	May. 23 2024	May. 22 2025
18	Artificial Mains	Rohde & Schwarz	ENV-216	HTT-E038	May. 23 2024	May. 22 2025
19	Cable Line	Robinson	Z302S-NJ-BNCJ-1.5M	HTT-E001	Apr. 26 2024	Apr. 25 2025
20	Attenuator	Robinson	6810.17A	HTT-E007	Apr. 26 2024	Apr. 25 2025
21	Variable frequency power supply	Shenzhen Yanghong Electric Co., Ltd	YF-650（5KVA）	HTT-E032	Apr. 26 2024	Apr. 25 2025
22	Control Room	Shenzhen C.R.T technology co., LTD	8*4*3.5	HTT-E029	Aug. 10 2024	Aug. 09 2027
23	DC power supply	Agilent	E3632A	HTT-E023	Apr. 26 2024	Apr. 25 2025
24	EMI Test Receiver	Agilent	N9020A	HTT-E024	Apr. 26 2024	Apr. 25 2025
25	Analog signal generator	Agilent	N5181A	HTT-E025	Apr. 26 2024	Apr. 25 2025
26	Vector signal generator	Agilent	N5182A	HTT-E026	Apr. 26 2024	Apr. 25 2025
27	Power sensor	Keysight	U2021XA	HTT-E027	Apr. 26 2024	Apr. 25 2025
28	Temperature and humidity meter	Shenzhen Anbiao Instrument Co., Ltd	TH10R	HTT-074	Apr. 28 2024	Apr. 27 2025
29	Radiated Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
30	Conducted Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
31	RF Test Software	panshanrf	TST	N/A	N/A	N/A

6. Test results and Measurement Data

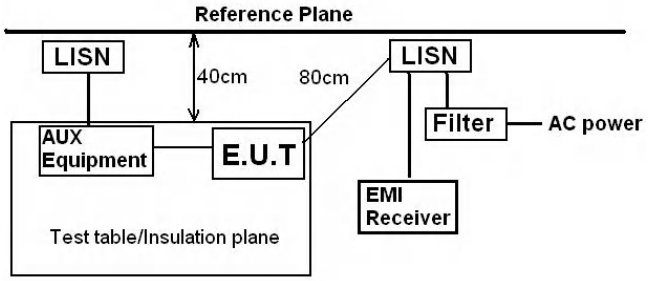
6.1. Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test setup:



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

Test procedure:

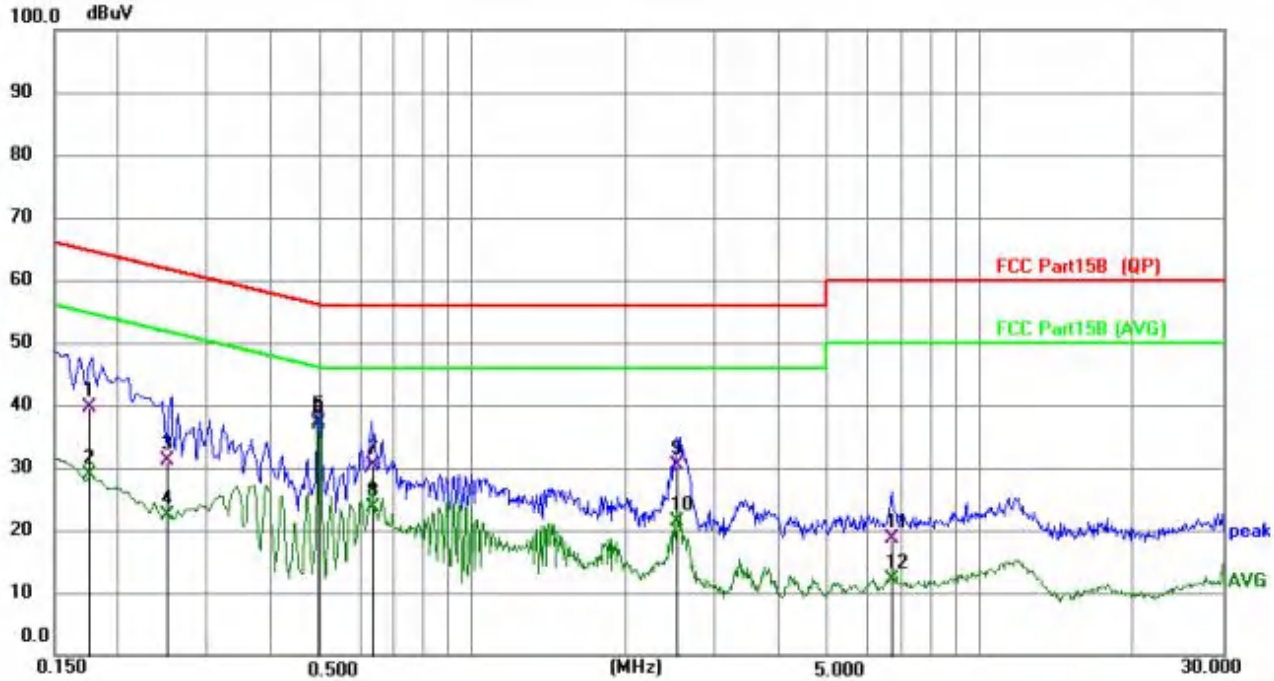
1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	PASS					

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

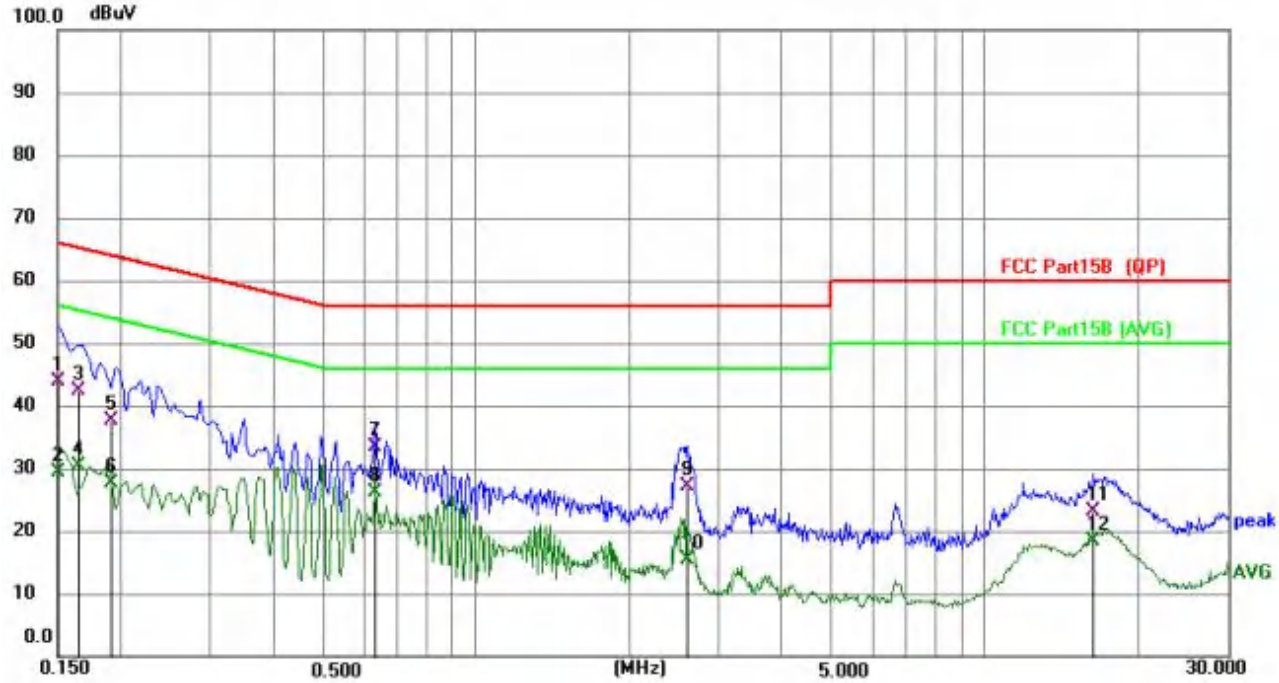
Measurement data:

Line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1758	29.53	10.19	39.72	64.68	-24.96	QP
2		0.1758	18.81	10.19	29.00	54.68	-25.68	AVG
3		0.2507	20.94	10.22	31.16	61.73	-30.57	QP
4		0.2507	12.20	10.22	22.42	51.73	-29.31	AVG
5		0.4982	27.16	10.29	37.45	56.03	-18.58	QP
6	*	0.4982	26.64	10.29	36.93	46.03	-9.10	AVG
7		0.6368	20.18	10.32	30.50	56.00	-25.50	QP
8		0.6368	13.19	10.32	23.51	46.00	-22.49	AVG
9		2.5272	19.82	10.46	30.28	56.00	-25.72	QP
10		2.5272	10.89	10.46	21.35	46.00	-24.65	AVG
11		6.7069	8.03	10.62	18.65	60.00	-41.35	QP
12		6.7069	1.46	10.62	12.08	50.00	-37.92	AVG

Neutral:

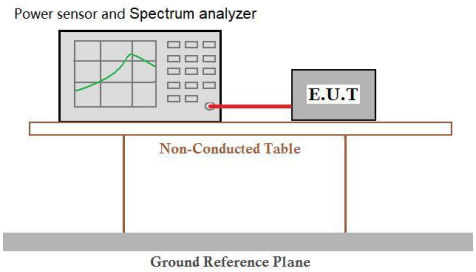


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1508	33.79	10.16	43.95	65.96	-22.01	QP
2		0.1508	19.15	10.16	29.31	55.96	-26.65	AVG
3		0.1655	32.31	10.18	42.49	65.18	-22.69	QP
4		0.1655	20.30	10.18	30.48	55.18	-24.70	AVG
5		0.1906	27.41	10.20	37.61	64.01	-26.40	QP
6		0.1906	17.55	10.20	27.75	54.01	-26.26	AVG
7		0.6347	22.93	10.35	33.28	56.00	-22.72	QP
8	*	0.6347	15.75	10.35	26.10	46.00	-19.90	AVG
9		2.6096	16.74	10.43	27.17	56.00	-28.83	QP
10		2.6096	4.91	10.43	15.34	46.00	-30.66	AVG
11		16.3847	12.03	11.19	23.22	60.00	-36.78	QP
12		16.3847	7.17	11.19	18.36	50.00	-31.64	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Los

6.2. Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	30dBm					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Measurement Data

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)				Verdict
			ANT1	ANT2	MIMO	Limit	
802.11b	SISO	2412	23.00	18.74	/	<=30	Pass
		2437	18.41	18.65	/	<=30	Pass
		2462	17.83	18.47	/	<=30	Pass
802.11g	SISO	2412	23.16	22.90	/	<=30	Pass
		2437	23.10	22.94	/	<=30	Pass
		2462	22.42	22.64	/	<=30	Pass
802.11n (HT20)	MIMO	2412	22.06	21.74	24.91	<=30	Pass
		2437	21.88	21.73	24.82	<=30	Pass
		2462	21.52	21.62	24.58	<=30	Pass
802.11n (HT40)	MIMO	2422	22.48	22.29	25.40	<=30	Pass
		2437	22.39	22.20	25.31	<=30	Pass
		2452	22.00	22.00	25.01	<=30	Pass

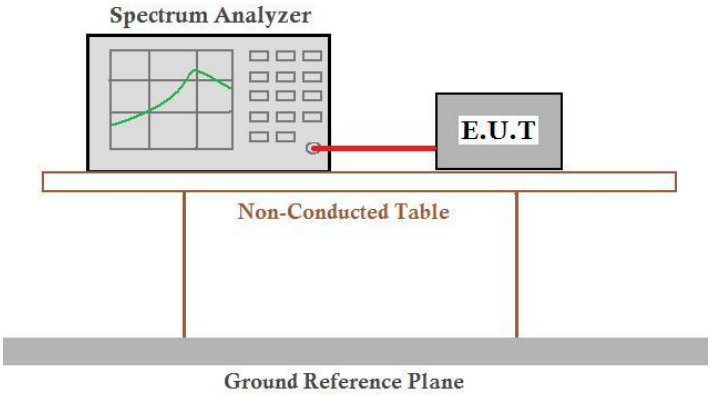
Note:

1) Measured output power at difference data rate for each mode and recorded worst case for each mode.

2) Test results including cable loss.

3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13Mbps at IEEE 802.11n HT40

6.3. Channel Bandwidth

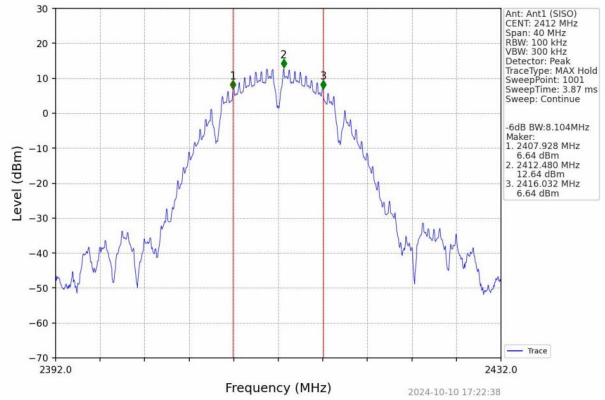
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	>500KHz					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

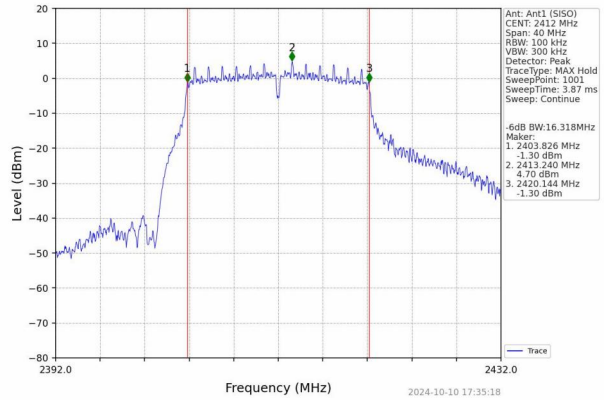
Measurement Data

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	8.104	>=0.5	Pass
		2437	1	8.089	>=0.5	Pass
		2462	1	8.048	>=0.5	Pass
802.11g	SISO	2412	1	16.318	>=0.5	Pass
		2437	1	16.301	>=0.5	Pass
		2462	1	16.023	>=0.5	Pass
802.11n (HT20)	MIMO	2412	1	17.212	>=0.5	Pass
		2437	1	16.706	>=0.5	Pass
		2462	1	17.533	>=0.5	Pass
802.11n (HT40)	MIMO	2422	1	35.156	>=0.5	Pass
		2437	1	35.144	>=0.5	Pass
		2452	1	35.158	>=0.5	Pass

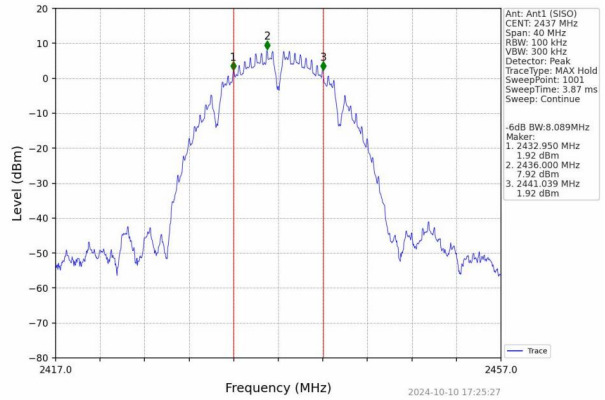
Test plot as follows:

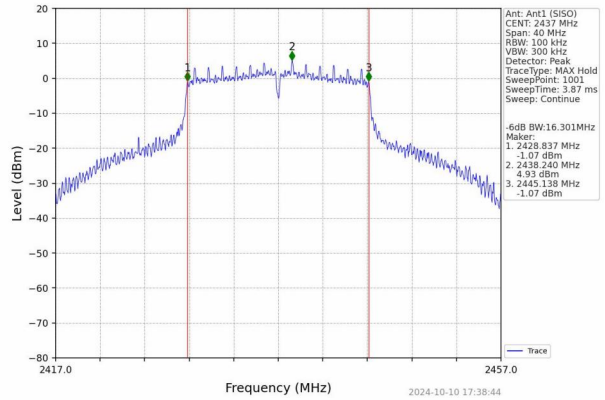
802.11b		802.11g	



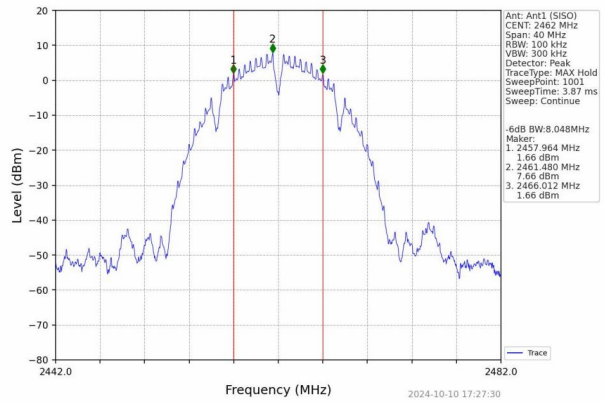


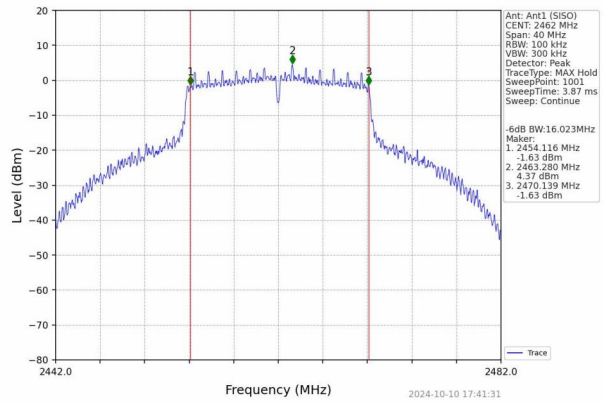
Lowest channel





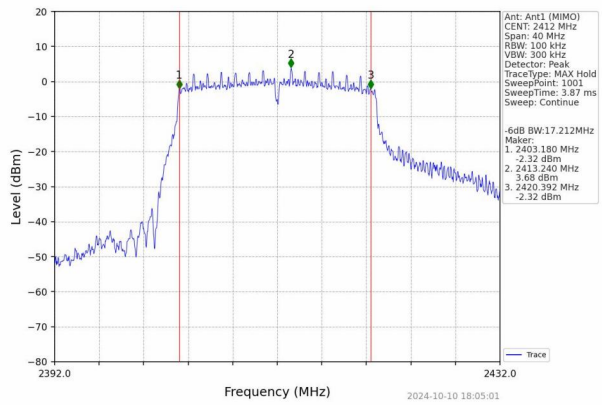
Middle channel

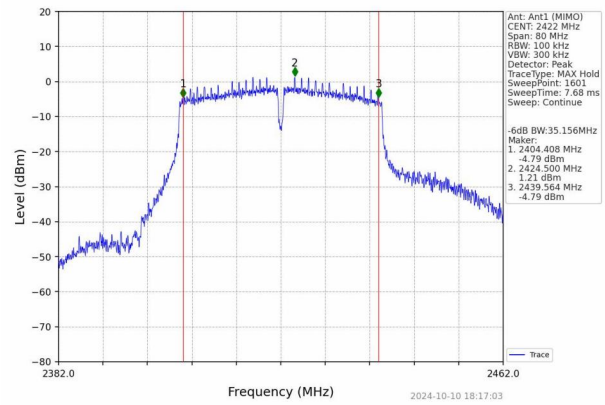




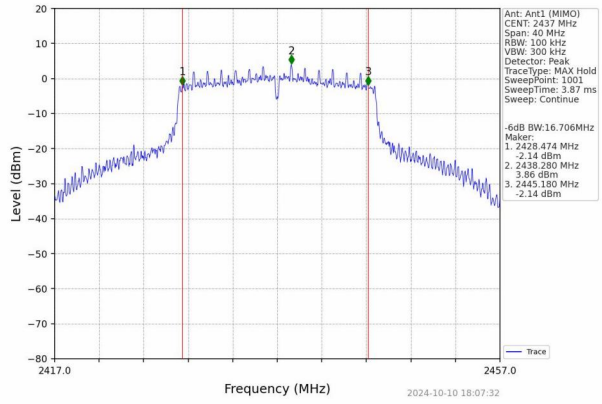
Highest channel

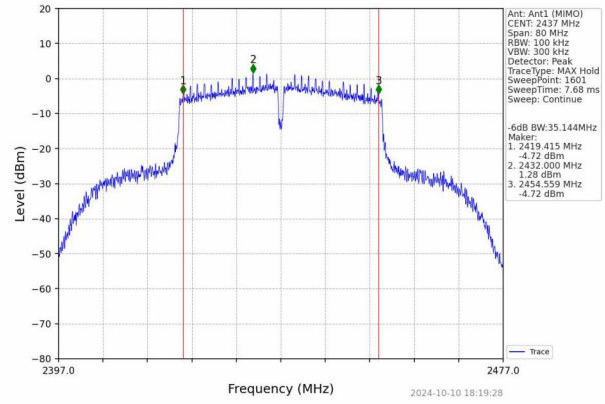
802.11n(HT20)		802.11n(HT40)	



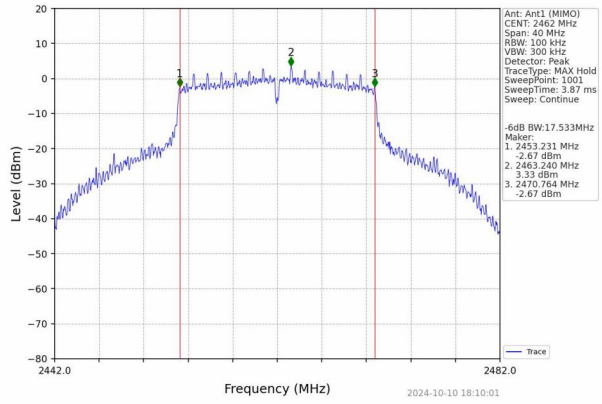


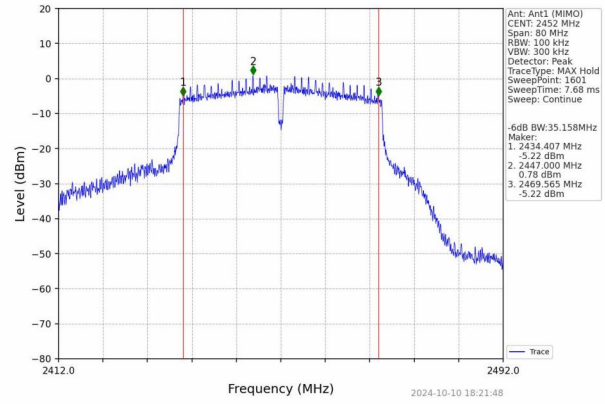
Lowest channel





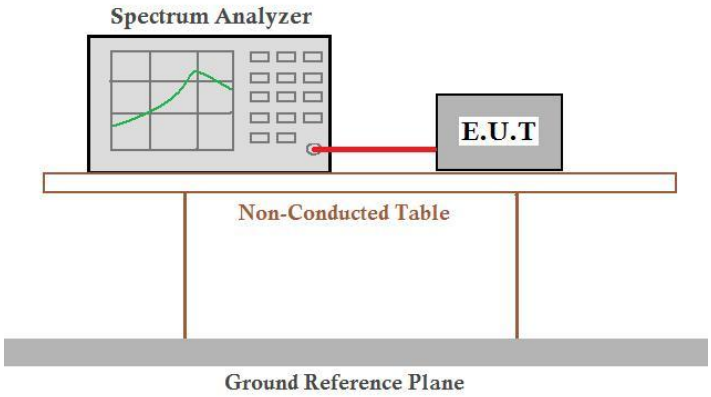
Middle channel





Highest channel

6.4. Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	8dBm/3kHz					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Measurement Data

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)				Verdict
			ANT1	ANT2	MIMO	Limit	
802.11b	SISO	2412	-1.79	-5.34	/	<=8	Pass
		2437	-6.65	-7.10	/	<=8	Pass
		2462	-6.78	-7.15	/	<=8	Pass
802.11g	SISO	2412	-10.21	-10.48	/	<=8	Pass
		2437	-9.94	-9.84	/	<=8	Pass
		2462	-10.81	-10.35	/	<=8	Pass
802.11n (HT20)	MIMO	2412	-11.79	-12.06	-9.39	<=8	Pass
		2437	-11.99	-11.03	-9.21	<=8	Pass
		2462	-11.35	-10.16	-8.60	<=8	Pass
802.11n (HT40)	MIMO	2422	-12.88	-13.32	-11.35	<=8	Pass
		2437	-13.60	-13.62	-11.41	<=8	Pass
		2452	-14.24	-14.24	-12.10	<=8	Pass

Note:

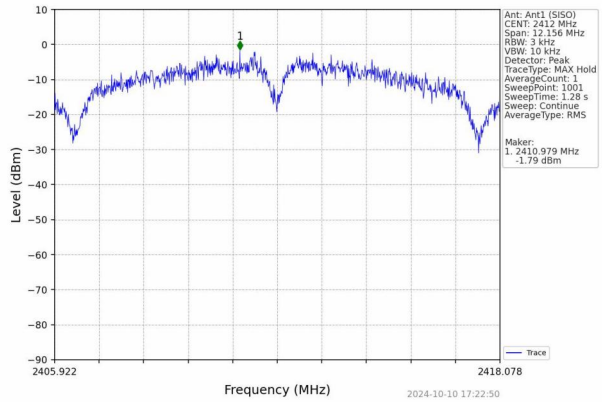
1) Measured peak power spectrum density at difference data rate for each mode and recorded worst case for each mode.

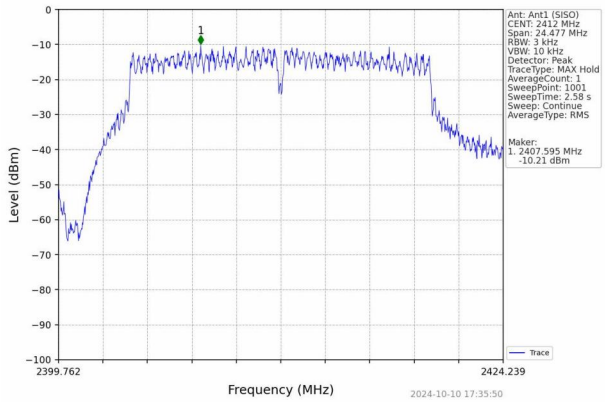
2) Test results including cable loss;

3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20;13Mbps at IEEE 802.11n HT40

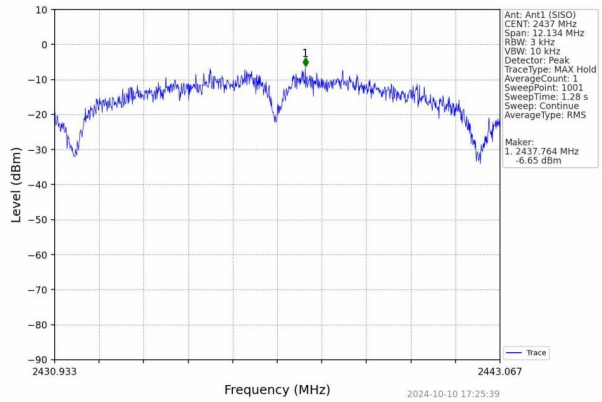
Test plot as follows:
ANT 1

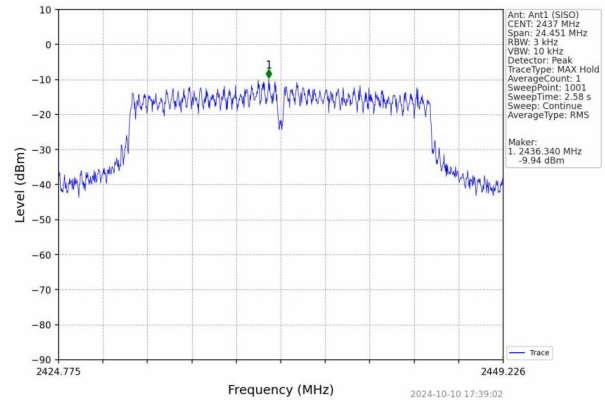
802.11b		802.11g	



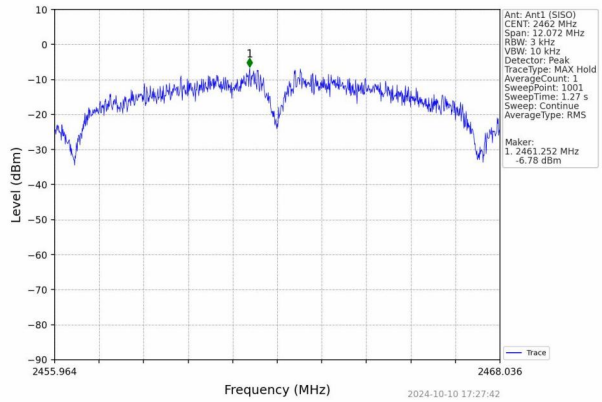


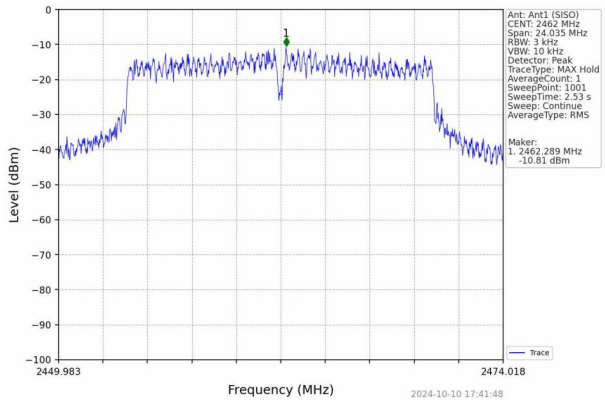
Lowest channel





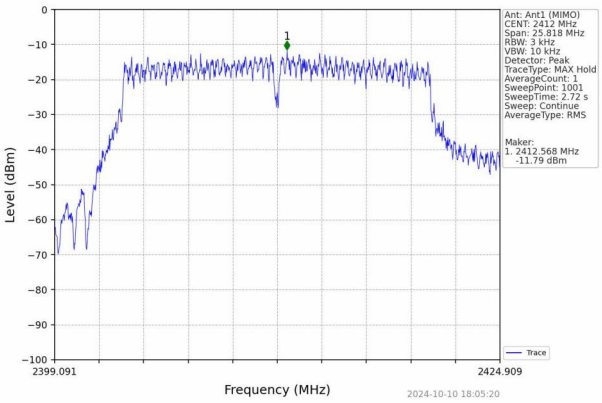
Middle channel

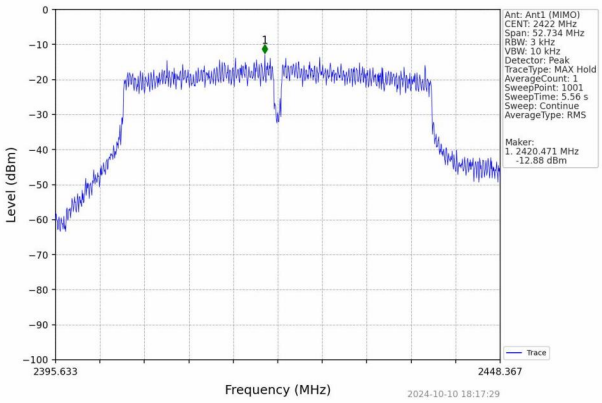




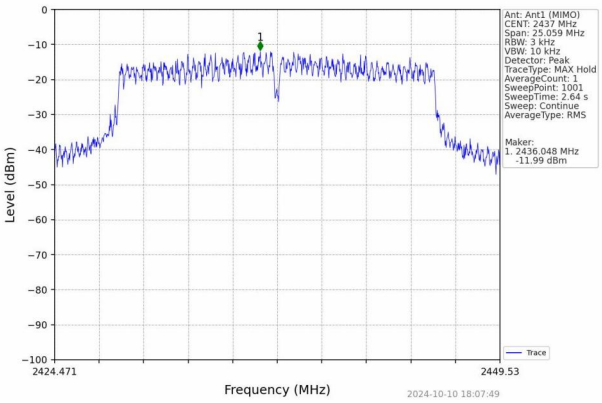
Highest channel

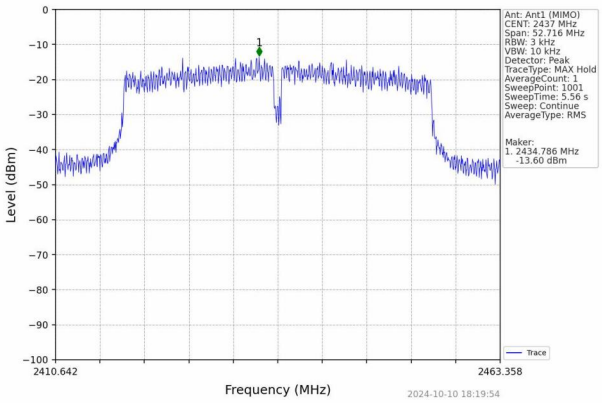
802.11n(HT20)		802.11n(HT40)	



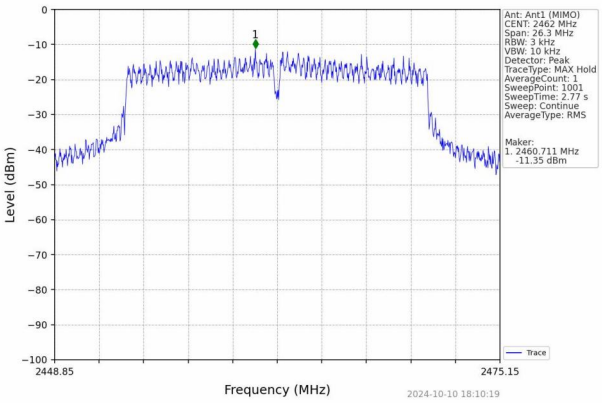


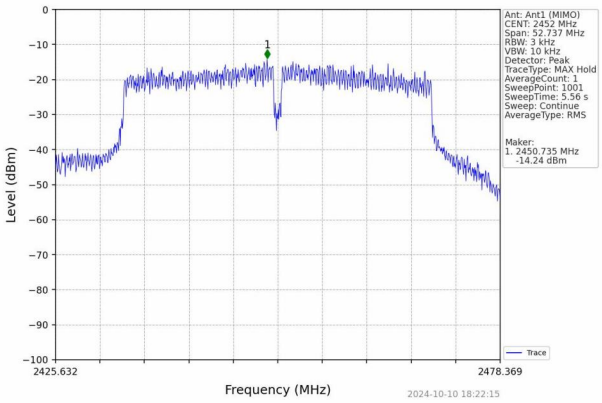
Lowest channel





Middle channel

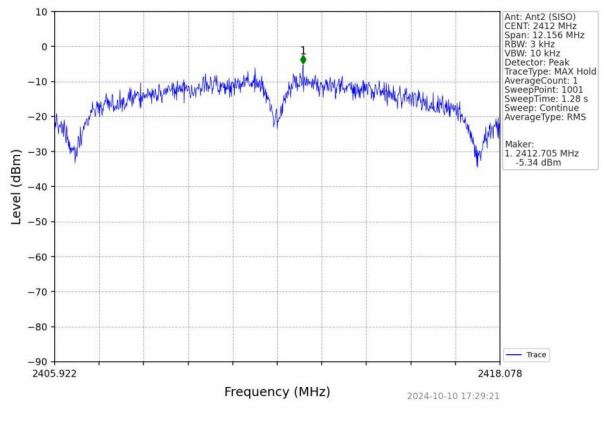


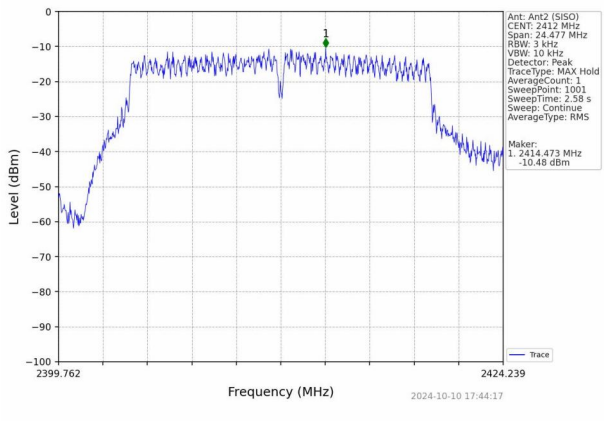


Highest channel

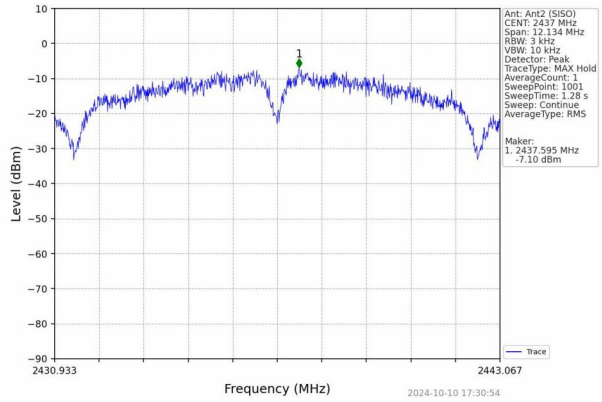
ANT 2

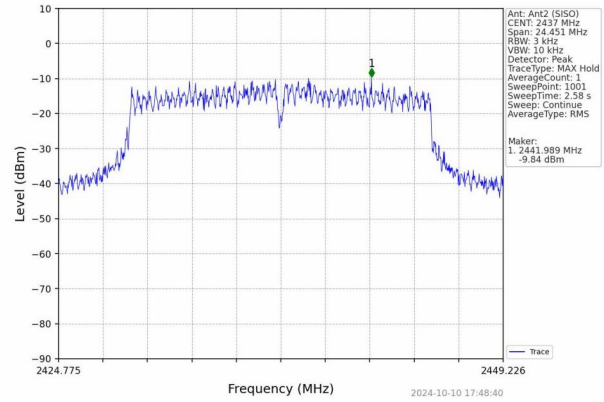
802.11b		802.11g	



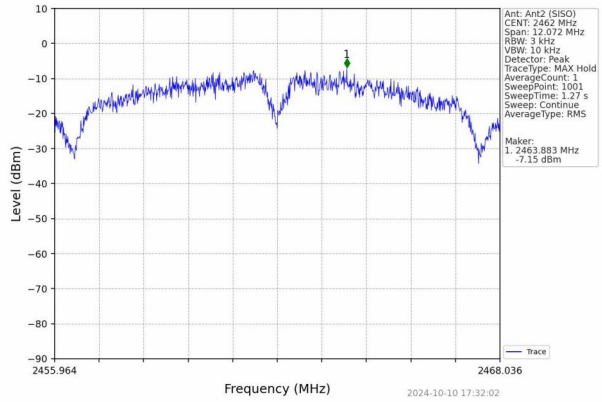


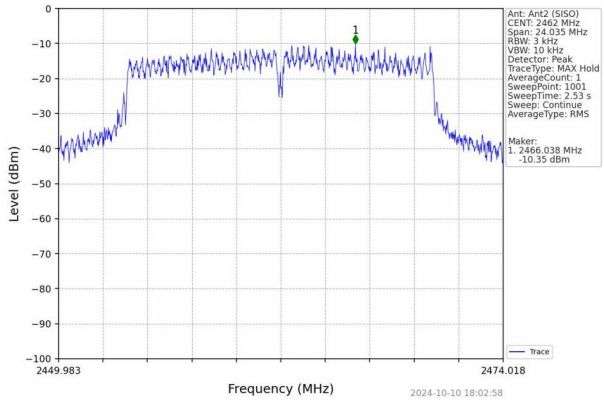
Lowest channel





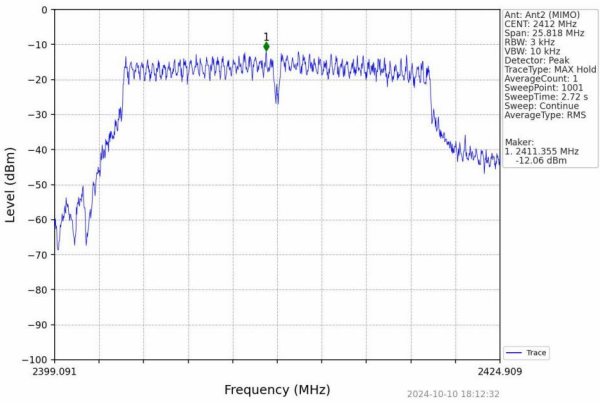
Middle channel

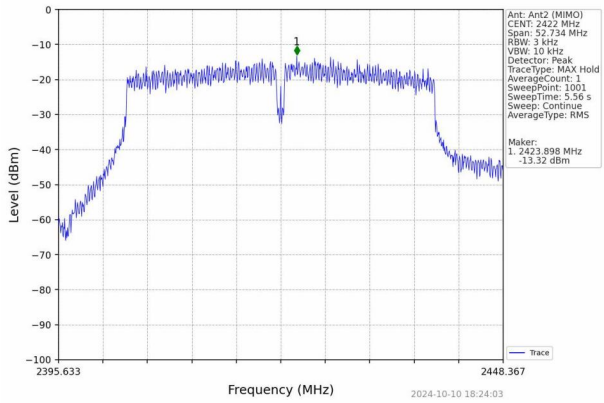




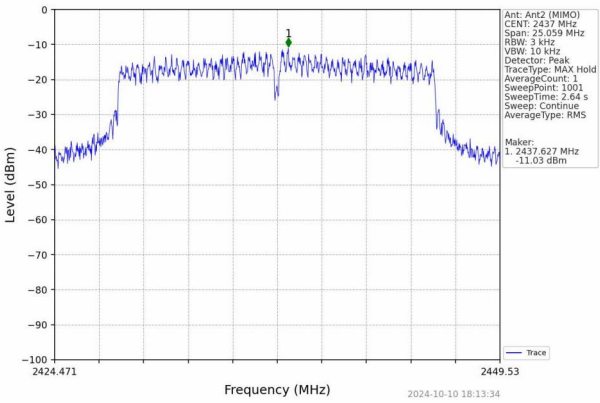
Highest channel

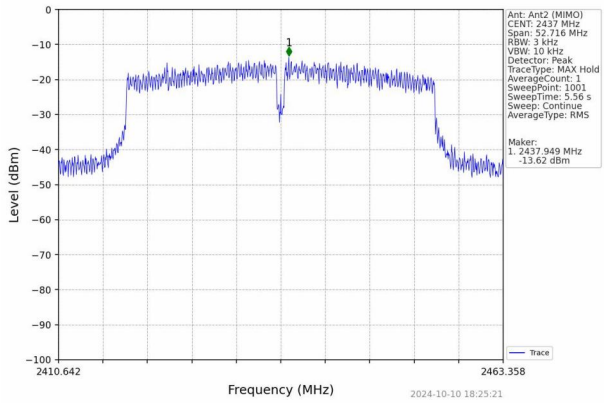
802.11n(HT20)		802.11n(HT40)	



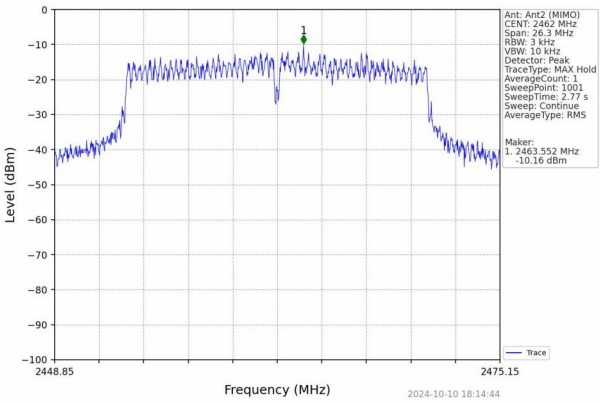


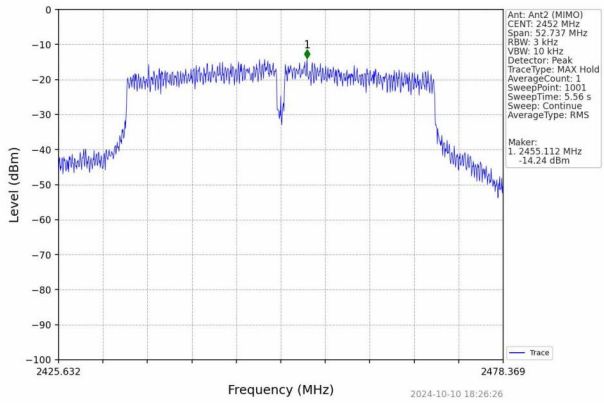
Lowest channel





Middle channel

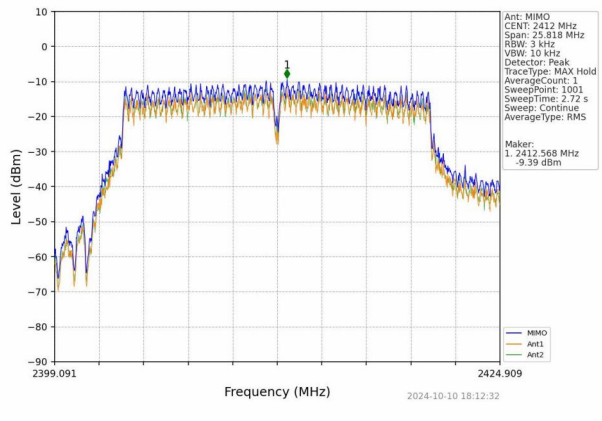


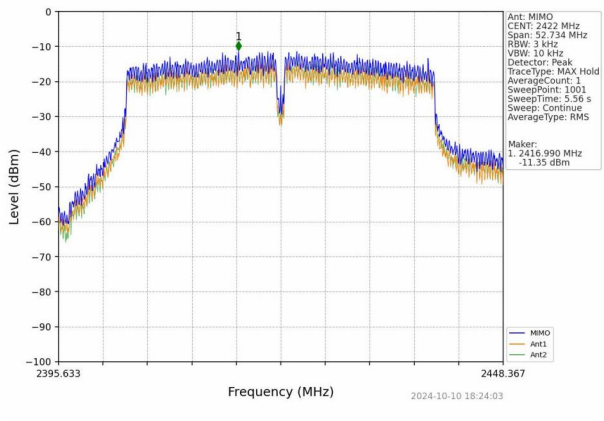


Highest channel

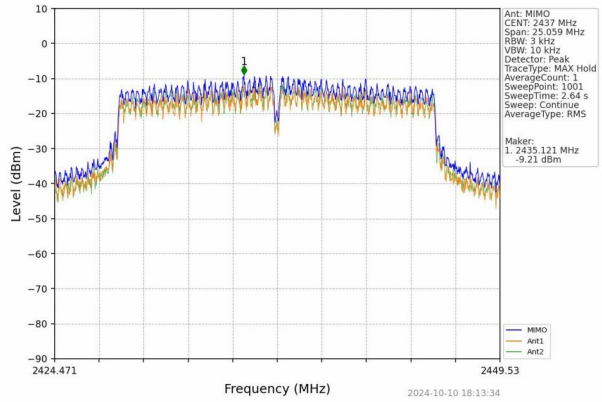
MIMO

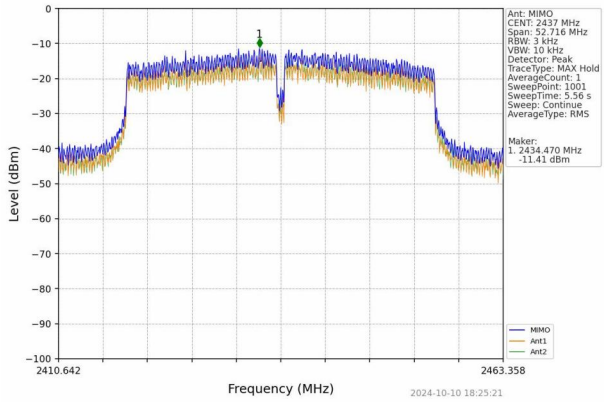
802.11n(HT20)		802.11n(HT40)	



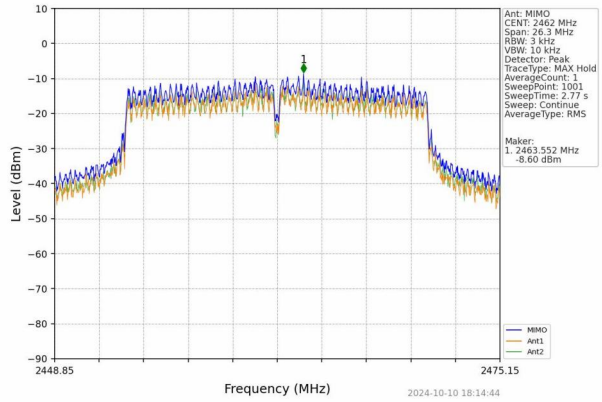


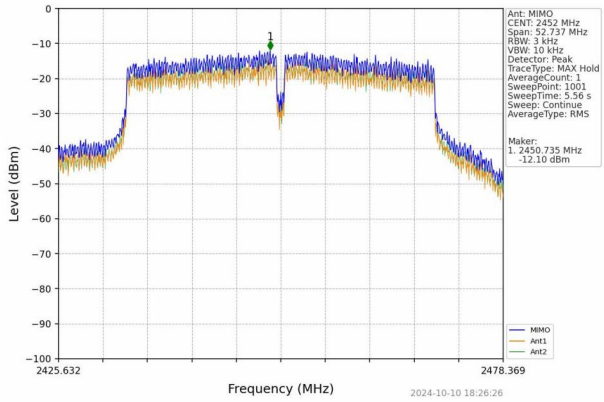
Lowest channel





Middle channel

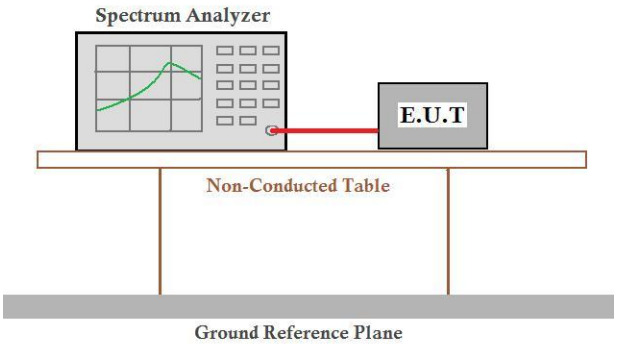




Highest channel

6.5. Band Edge

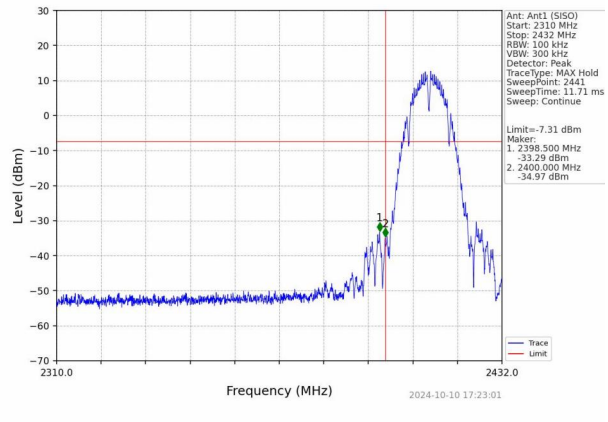
6.5.1. Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

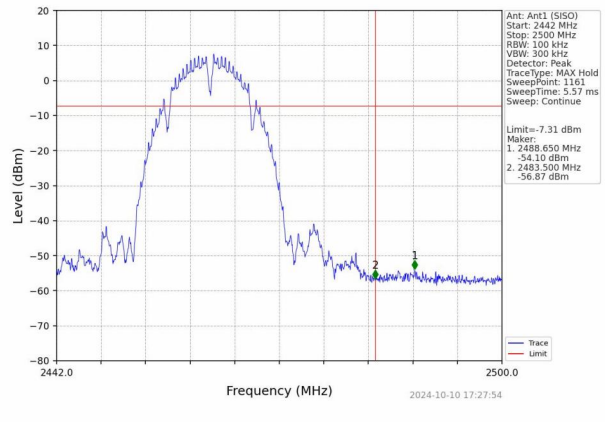
Test plot as follows:

ANT 1

Test mode:	802.11b

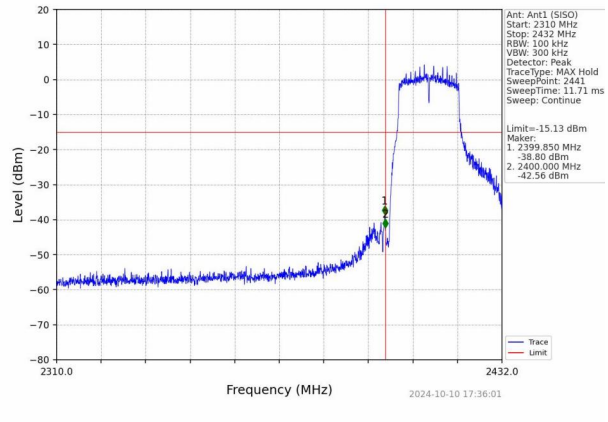


Lowest channel

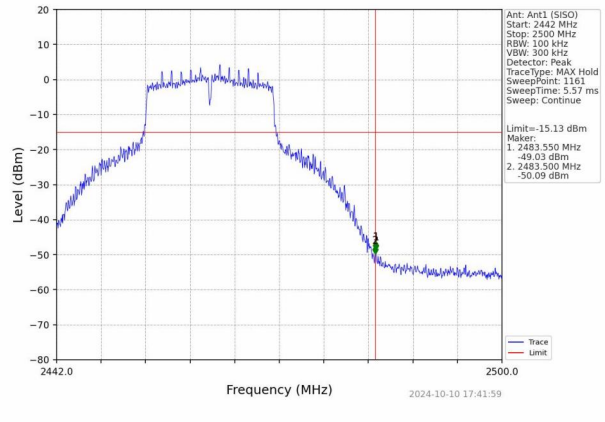


Highest channel

Test mode:	802.11g

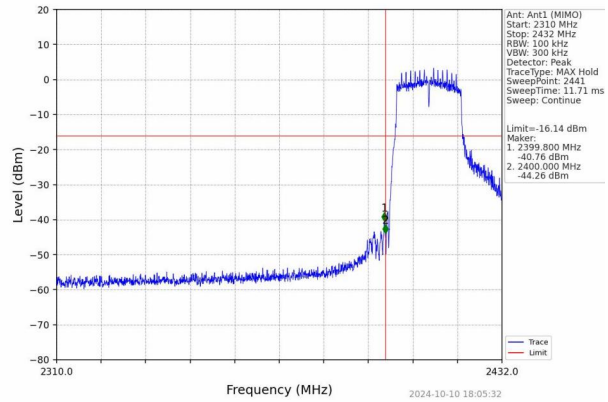


Lowest channel

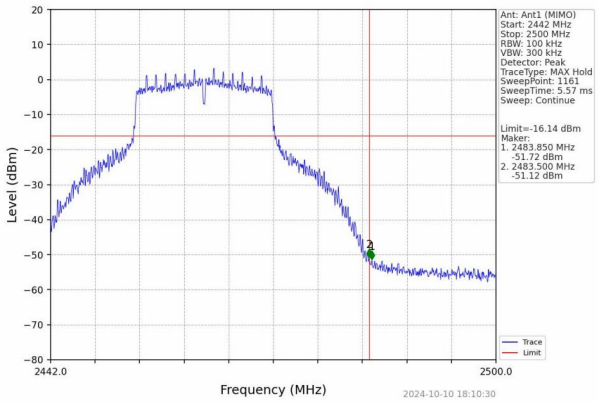


Highest channel

Test mode:	802.11n(HT20)

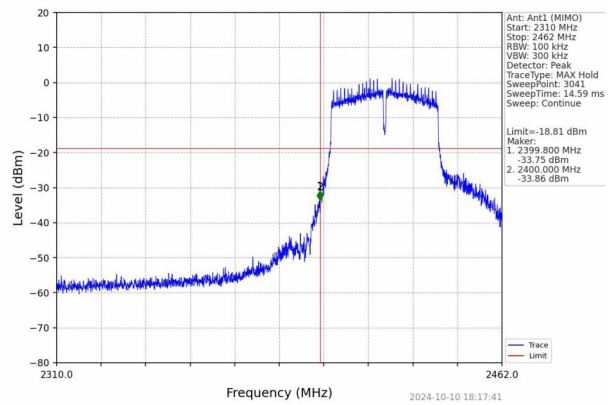


Lowest channel

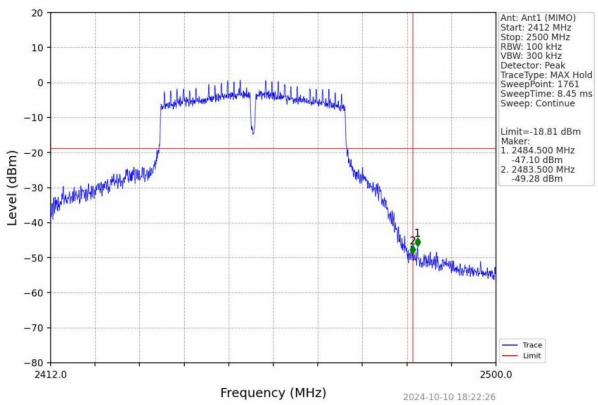


Highest channel

Test mode:	802.11n(HT40)



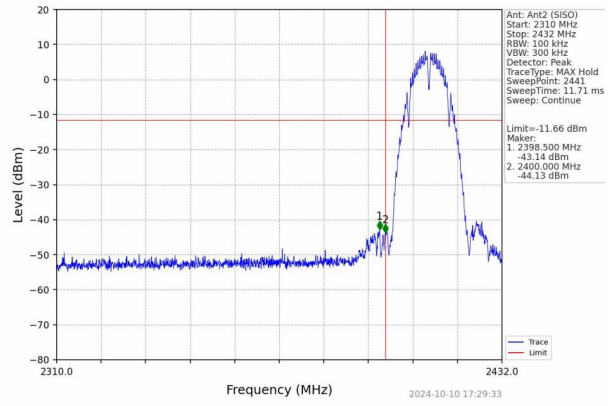
Lowest channel



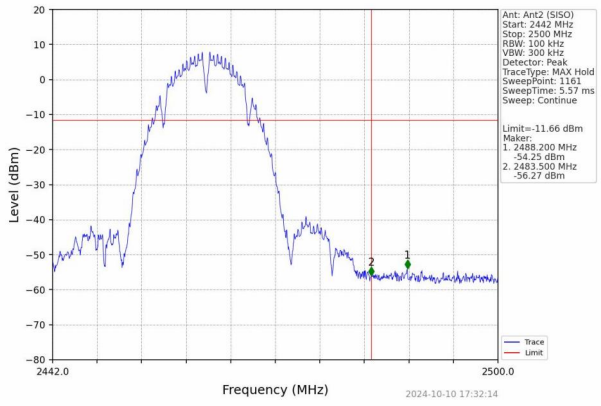
Highest channel

ANT 2

Test mode:	802.11b

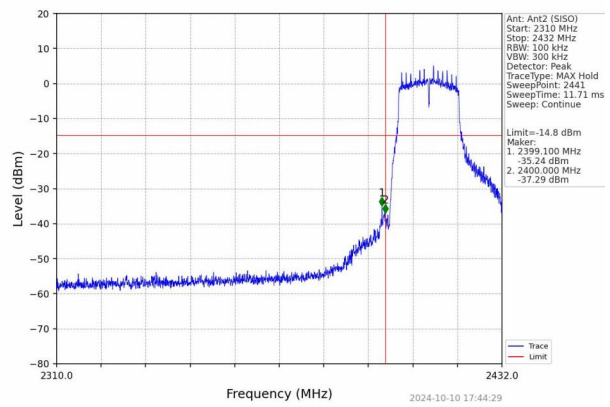


Lowest channel

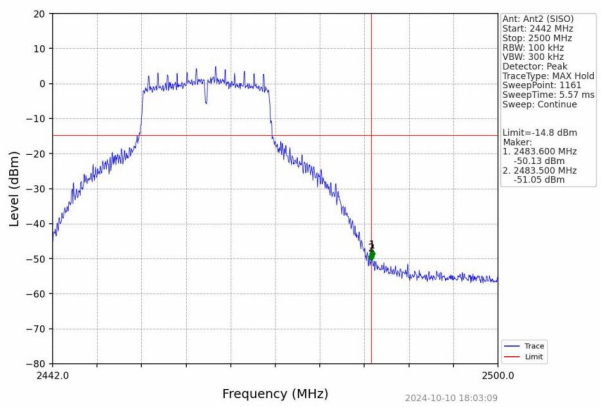


Highest channel

Test mode:	802.11g

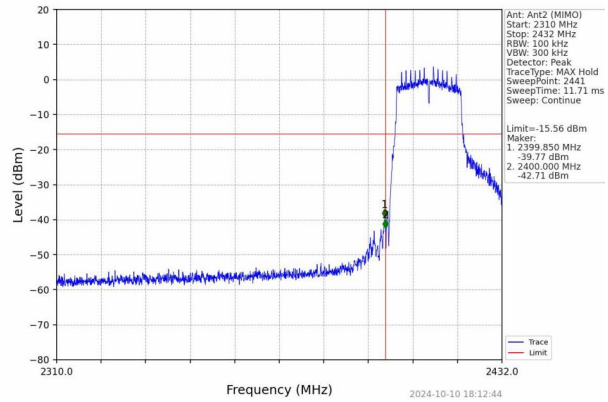


Lowest channel

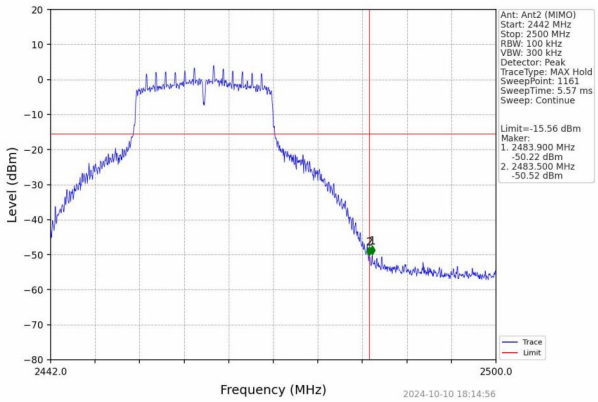


Highest channel

Test mode:	802.11n(HT20)

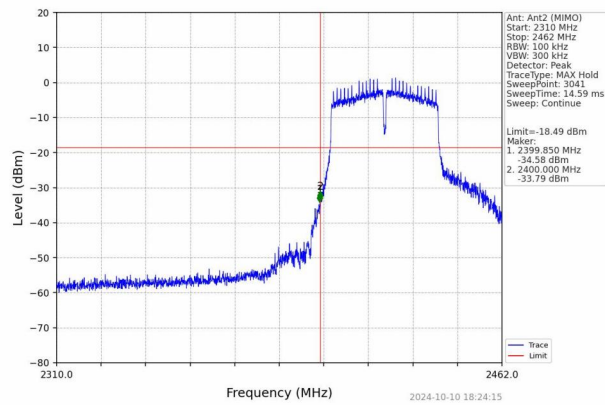


Lowest channel

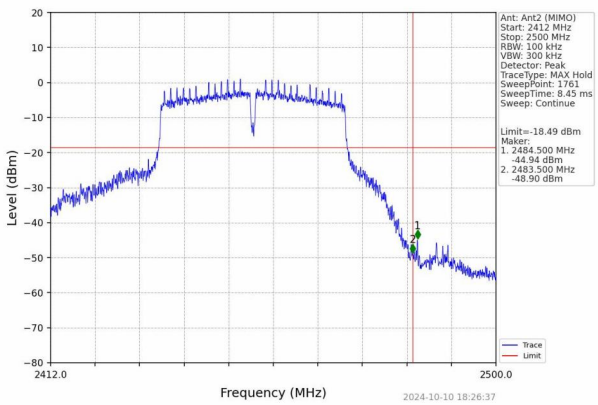


Highest channel

Test mode:	802.11n(HT40)



Lowest channel



Highest channel

6.5.2. Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.
Test site:	Measurement Distance: 3m

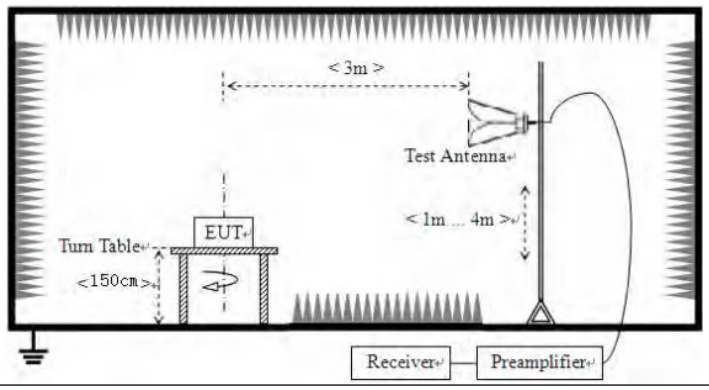
Receiver setup:

Frequency	Detector	RBW	VBW	Remark
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
Above 1GHz	54.00	Average Value
	74.00	Peak Value

Test setup:



Test Procedure:

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

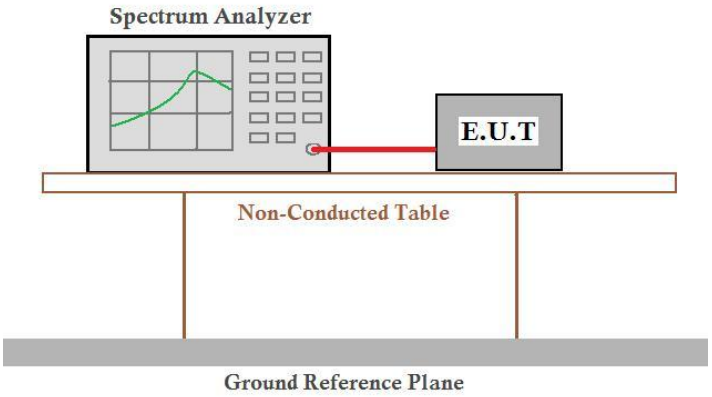
Measurement Data

Remark: During the test, pre-scan the 802.11b/802.11g/802.11n (H20)/802.11n (H40) modulation, and found the 802.11b modulation which it is worse case.

Frequency(MHz):			**2412**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	61.24	PK	74	12.76	62.63	27.2	4.31	32.9	-1.39
2390.00	44.47	AV	54	9.53	45.86	27.2	4.31	32.9	-1.39
Frequency(MHz):			**2412**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	60.66	PK	74	13.34	62.05	27.2	4.31	32.9	-1.39
2390.00	45.34	AV	54	8.66	46.73	27.2	4.31	32.9	-1.39
Frequency(MHz):			**2462**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	57.57	PK	74	16.43	58.50	27.4	4.47	32.8	-0.93
2483.50	45.06	AV	54	8.94	45.99	27.4	4.47	32.8	-0.93
Frequency(MHz):			**2462**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	55.87	PK	74	18.13	56.80	27.4	4.47	32.8	-0.93
2483.50	43.96	AV	54	10.04	44.89	27.4	4.47	32.8	-0.93

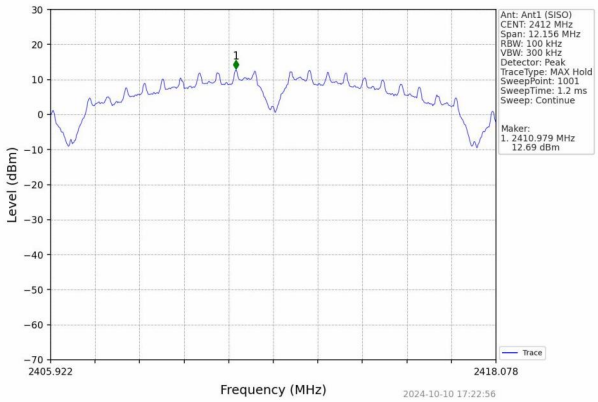
6.6. Spurious Emission

6.6.1. Conducted Emission Method

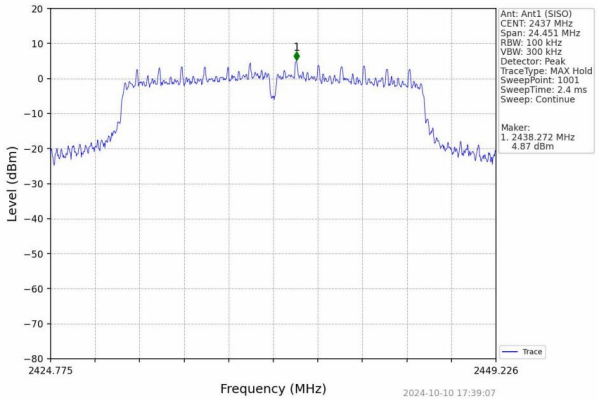
Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Measurement Data:
ANT 1

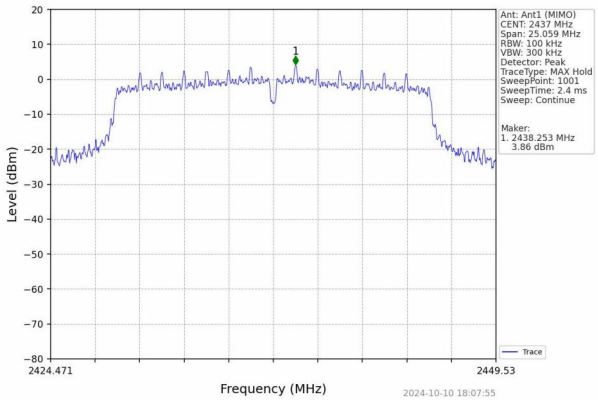
Reference



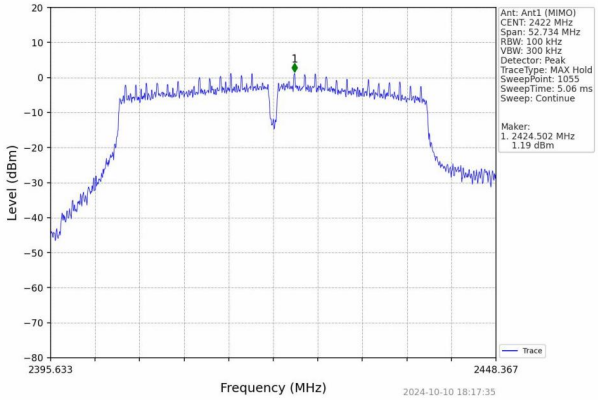
802.11b



802.11g



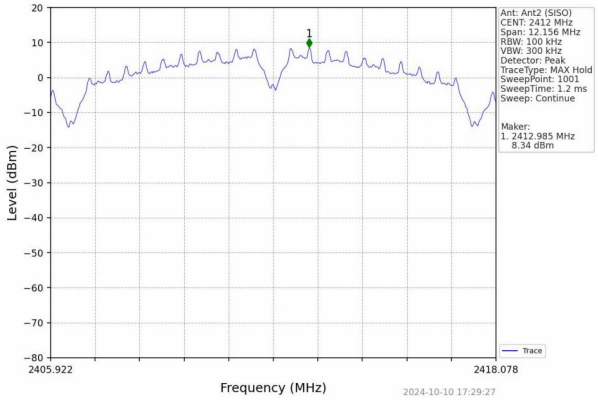
802.11n(HT20)



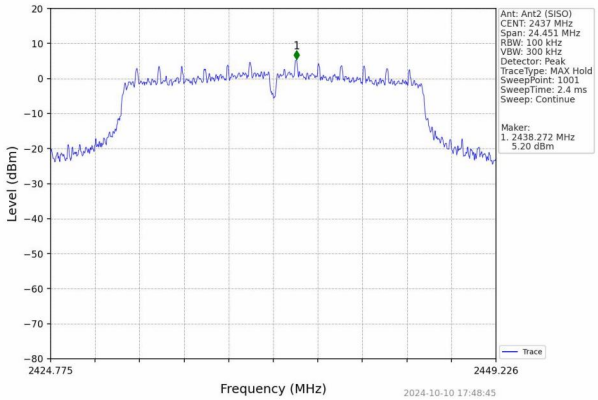
802.11n(HT40)

ANT 2

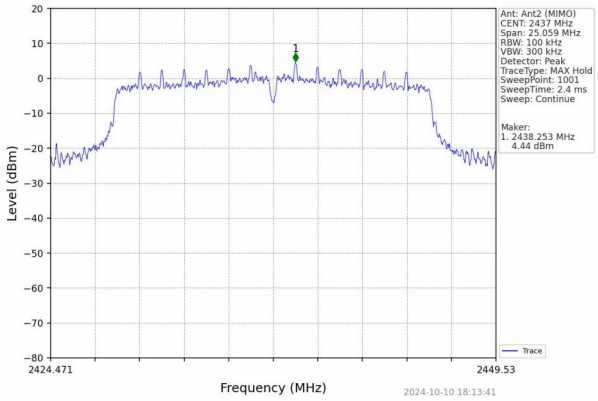
Reference



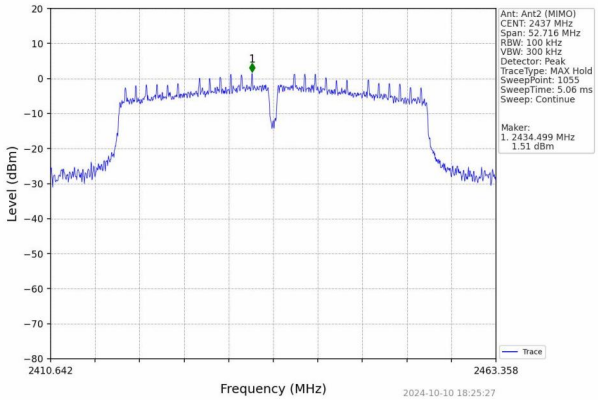
802.11b



802.11g



802.11n(HT20)

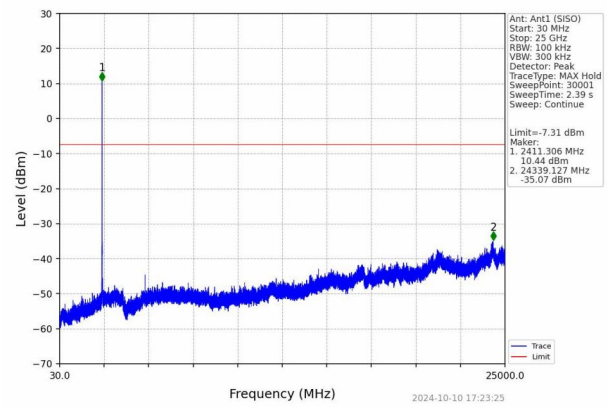


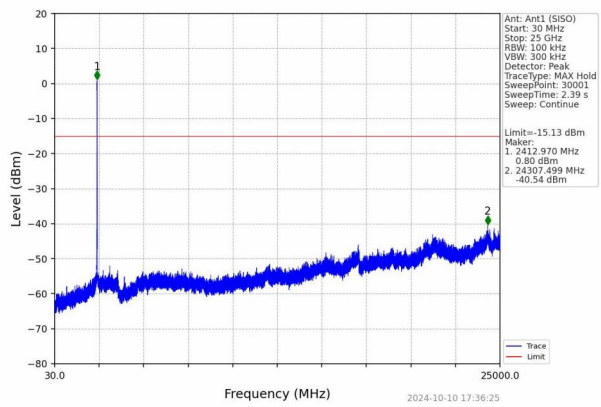
802.11n(HT40)

ANT 1

802.11b	802.11g

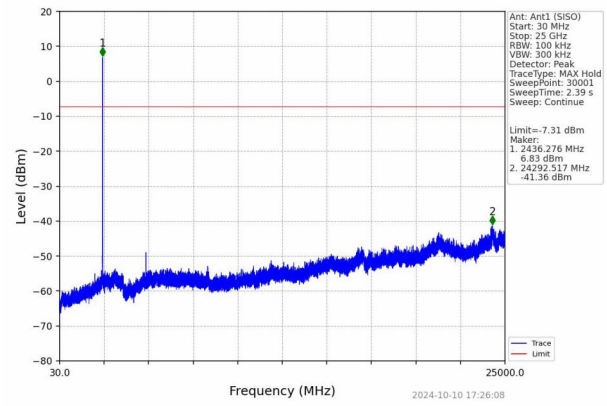
Lowest channel

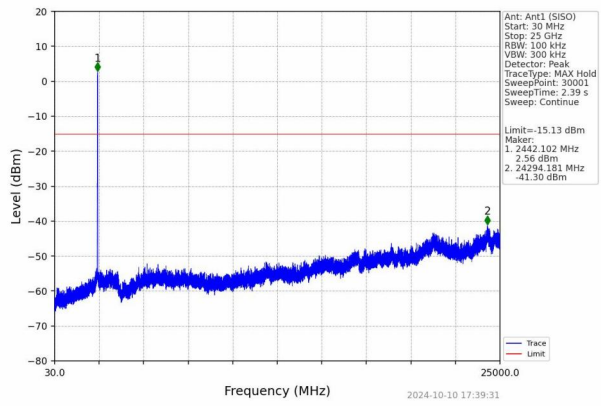




30MHz~25GHz

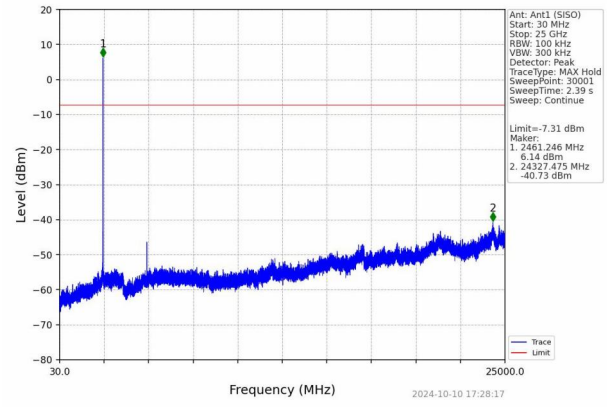
Middle channel

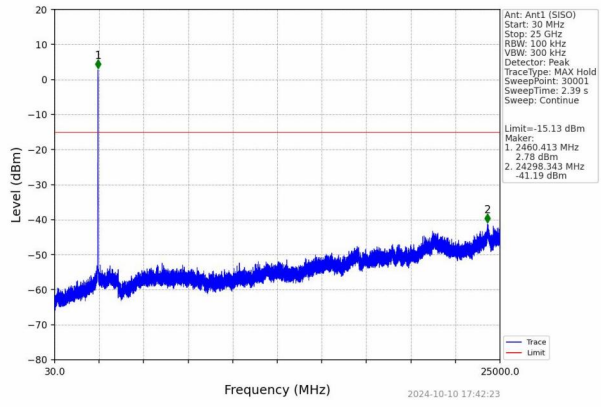




30MHz~25GHz

Highest channel

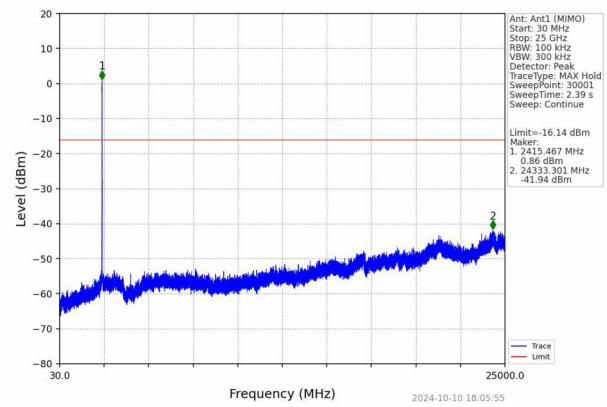


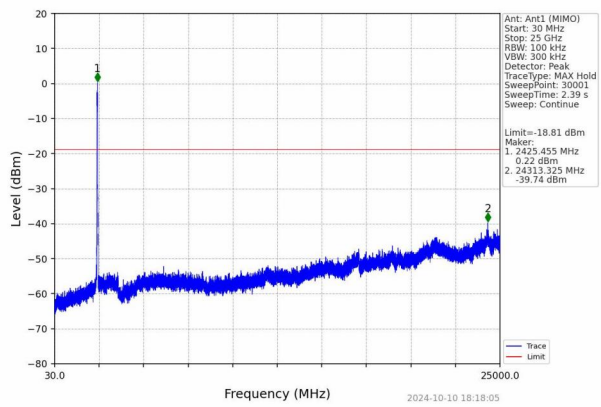


30MHz~25GHz

802.11n(HT20)	802.11n(HT40)

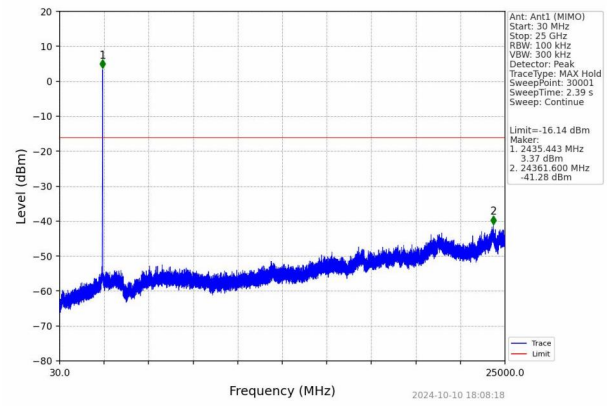
Lowest channel

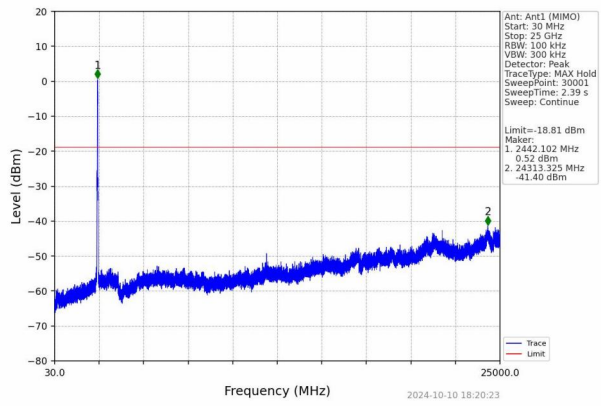




30MHz~25GHz

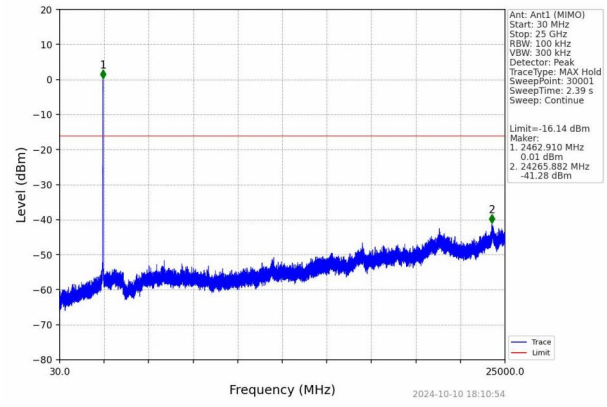
Middle channel

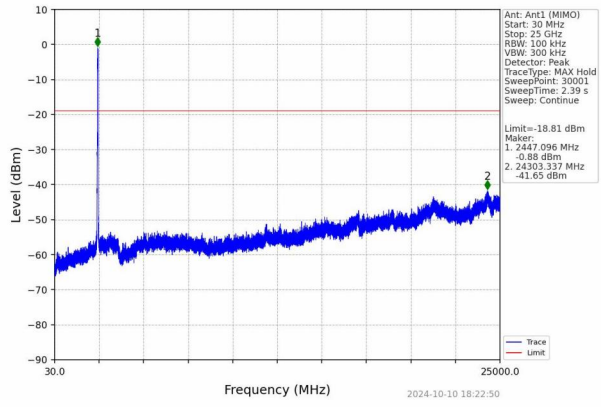




30MHz~25GHz

Highest channel



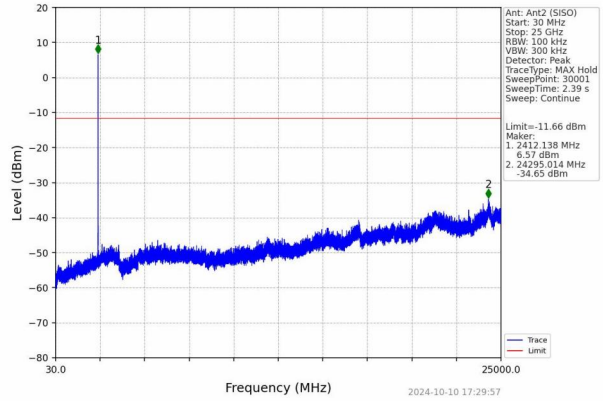


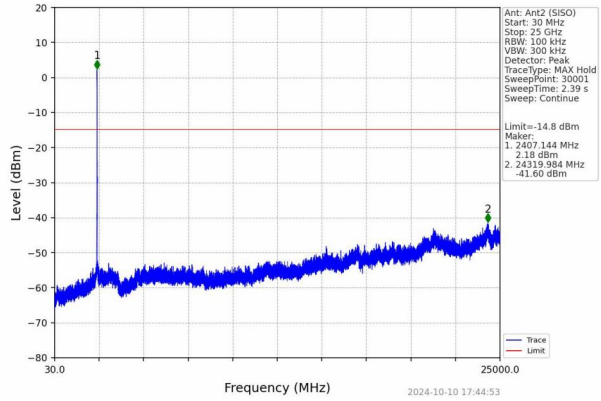
30MHz~25GHz

ANT 2

802.11b	802.11g

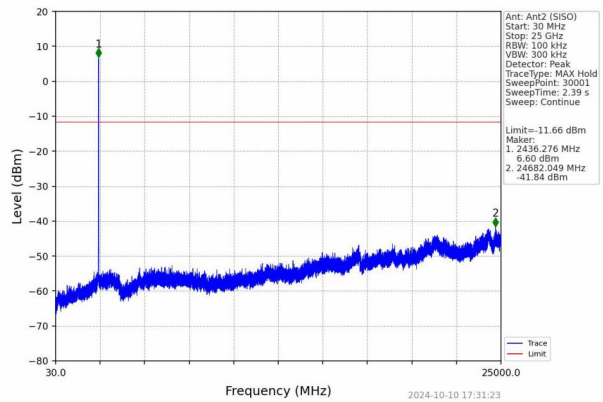
Lowest channel

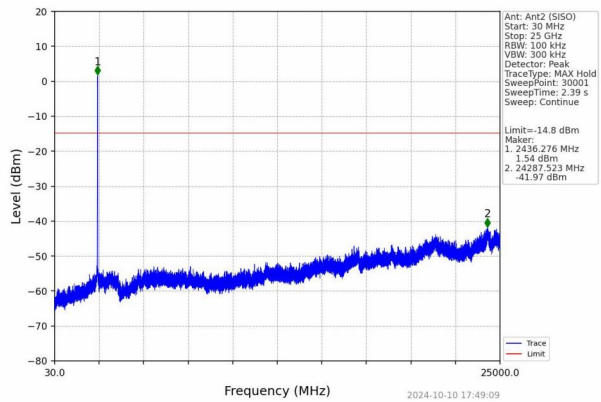




30MHz~25GHz

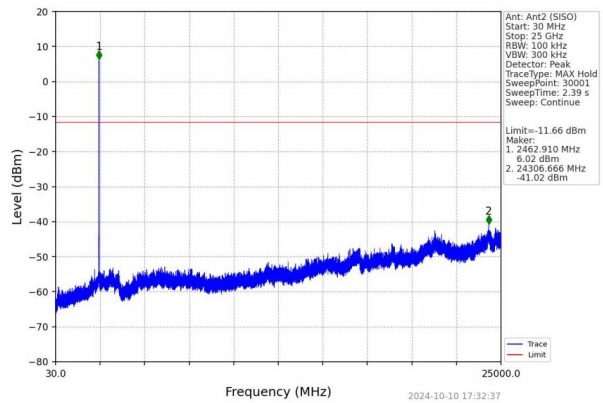
Middle channel

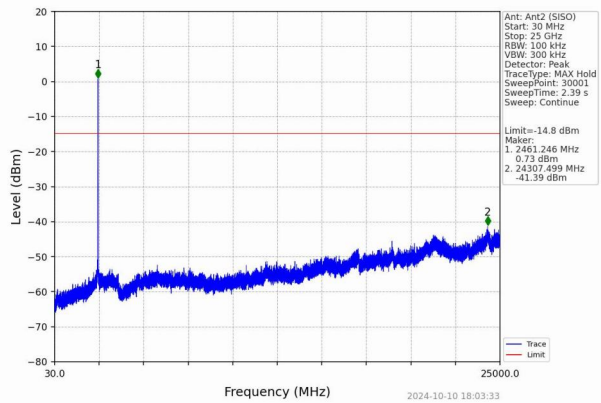




30MHz~25GHz

Highest channel

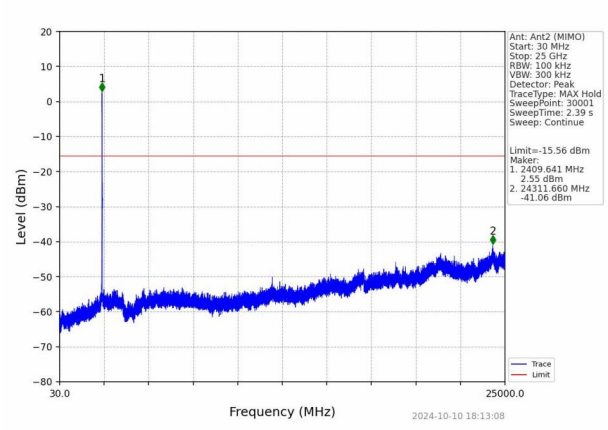


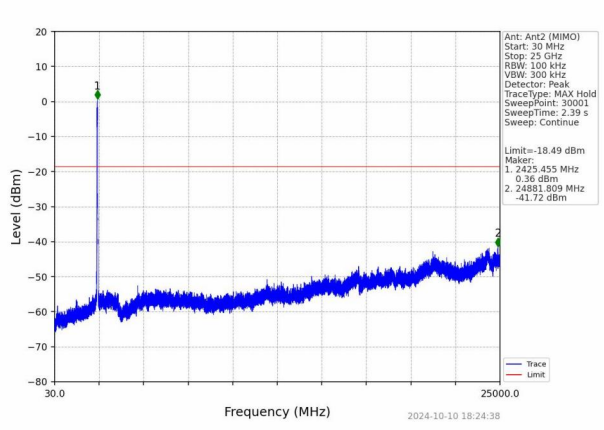


30MHz~25GHz

802.11n(HT20)	802.11n(HT40)

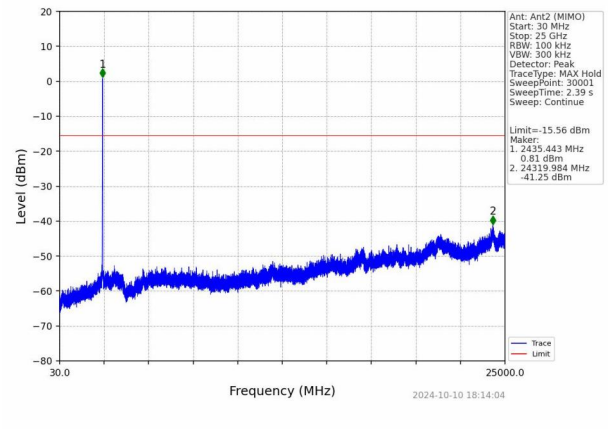
Lowest channel

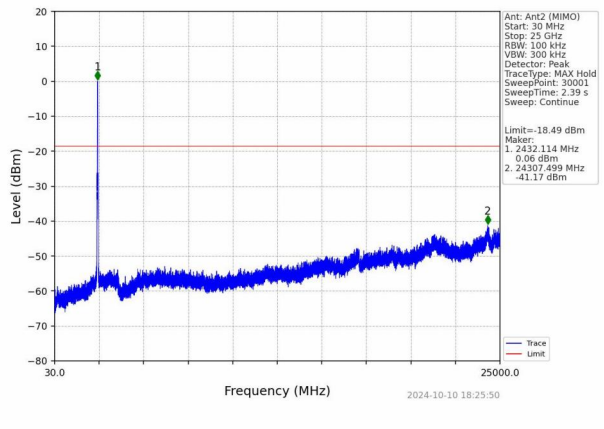




30MHz~25GHz

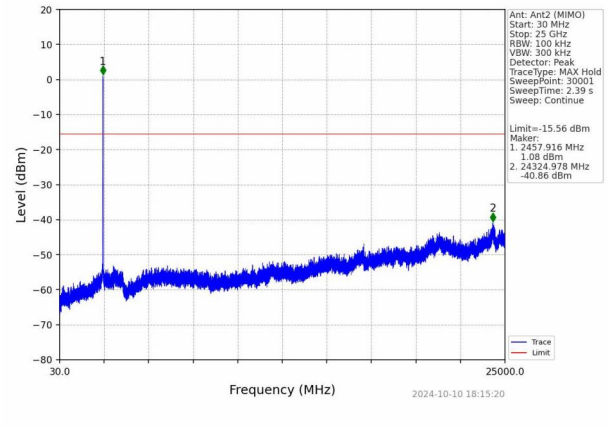
Middle channel

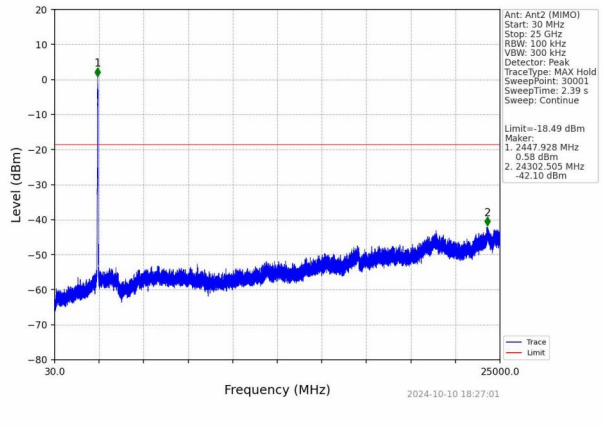




30MHz~25GHz

Highest channel





30MHz~25GHz

6.6.2. Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

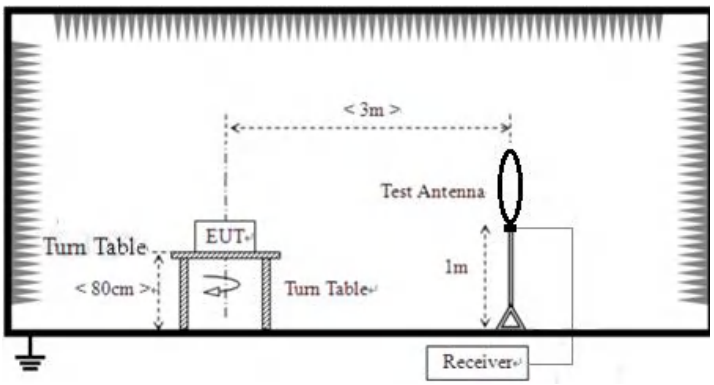
Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

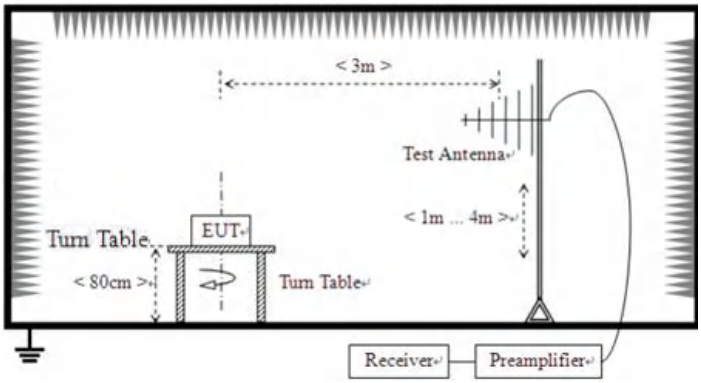
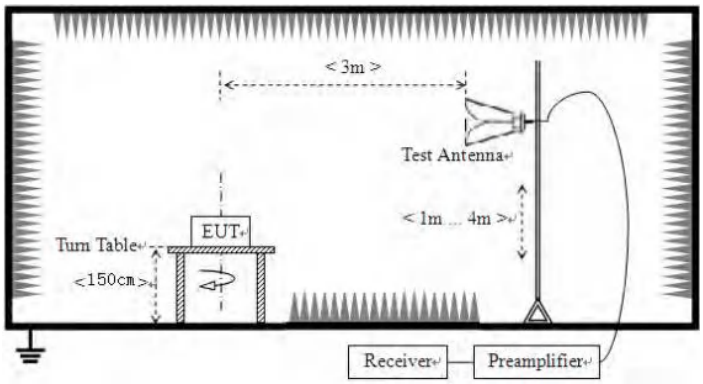
Limit:

Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	30m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

Test setup:

For radiated emissions from 9kHz to 30MHz



	For radiated emissions from 30MHz to1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details

Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remarks:
1.Only the worst case Main Antenna test data.
2.Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement data:

- **9kHz~30MHz**

  The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

■ **Below 1GHz**

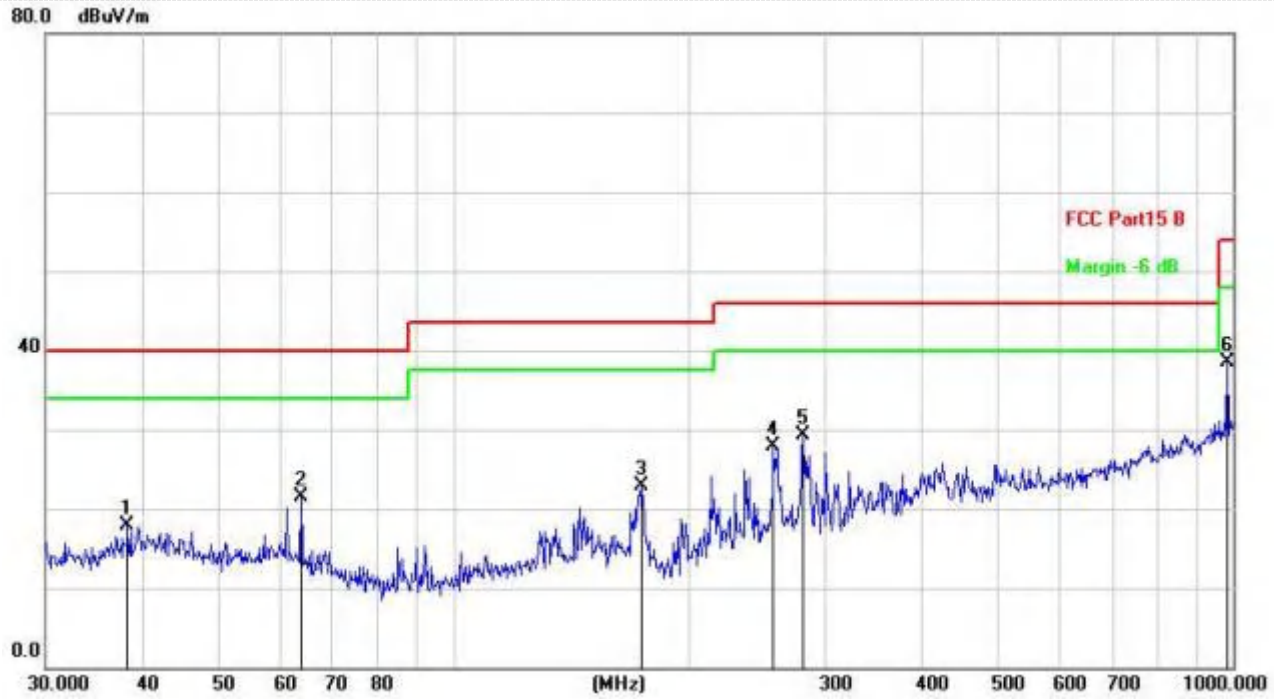
Pre-scan all test modes, found worst case at 802.11b 2437MHz, and so only show the test result of 802.11b 2437MHz

Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1		125.0066	33.10	-12.78	20.32	43.50	-23.18	peak
2		200.6881	40.84	-13.39	27.45	43.50	-16.05	peak
3		258.3264	50.26	-11.42	38.84	46.00	-7.16	peak
4	*	283.9791	50.52	-11.18	39.34	46.00	-6.66	peak
5		449.5558	41.76	-6.31	35.45	46.00	-10.55	peak
6		982.6200	27.84	3.46	31.30	54.00	-22.70	peak

Final Level =Receiver Read level + Correct Factor

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1		38.2120	28.51	-10.52	17.99	40.00	-22.01	peak
2		63.7588	33.77	-12.25	21.52	40.00	-18.48	peak
3		174.4241	34.59	-11.77	22.82	43.50	-20.68	peak
4		257.4222	39.29	-11.42	27.87	46.00	-18.13	peak
5		281.0075	40.62	-11.31	29.31	46.00	-16.69	peak
6	*	982.6200	34.96	3.46	38.42	54.00	-15.58	peak

Final Level =Receiver Read level + Correct Factor

■ **Above 1-25GHz**

Note: During the test, pre-scan the 802.11b/802.11g/802.11n (H20)/802.11n (H40) modulation, and found the 802.11b modulation which it is worse case.

802.11b:

Frequency(MHz):			2412		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	58.69	PK	74	15.31	52.87	31.05	6.52	31.75	5.82
4824.00	43.84	AV	54	10.16	38.02	31.05	6.52	31.75	5.82
7236.00	56.90	PK	74	17.10	44.09	36.08	8.18	31.45	12.81
7236.00	46.79	AV	54	7.21	33.98	36.08	8.18	31.45	12.81

Frequency(MHz):			2412		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	60.50	PK	74	13.50	54.68	31.05	6.52	31.75	5.82
4824.00	43.42	AV	54	10.58	37.60	31.05	6.52	31.75	5.82
7236.00	56.08	PK	74	17.92	43.27	36.08	8.18	31.45	12.81
7236.00	45.69	AV	54	8.31	32.88	36.08	8.18	31.45	12.81

Frequency(MHz):			2437		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	61.89	PK	74	12.11	55.45	31.25	6.7	31.51	6.44
4874.00	45.58	AV	54	8.42	39.14	31.25	6.7	31.51	6.44
7311.00	56.10	PK	74	17.90	42.96	36.25	8.31	31.42	13.14
7311.00	46.82	AV	54	7.18	33.68	36.25	8.31	31.42	13.14

Frequency(MHz):			2437		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	60.65	PK	74	13.35	54.21	31.25	6.7	31.51	6.44
4874.00	46.26	AV	54	7.74	39.82	31.25	6.7	31.51	6.44
7311.00	56.83	PK	74	17.17	43.69	36.25	8.31	31.42	13.14
7311.00	47.04	AV	54	6.96	33.90	36.25	8.31	31.42	13.14

Frequency(MHz):			2462		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	60.52	PK	74	13.48	53.65	31.52	6.8	31.45	6.87
4924.00	45.60	AV	54	8.40	38.73	31.52	6.8	31.45	6.87
7386.00	55.84	PK	74	18.16	42.28	36.51	8.4	31.35	13.56
7386.00	45.39	AV	54	8.61	31.83	36.51	8.4	31.35	13.56

Frequency(MHz):			2462		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	60.16	PK	74	13.84	53.29	31.52	6.8	31.45	6.87
4924.00	45.09	AV	54	8.91	38.22	31.52	6.8	31.45	6.87
7386.00	56.92	PK	74	17.08	43.36	36.51	8.4	31.35	13.56
7386.00	47.36	AV	54	6.64	33.80	36.51	8.4	31.35	13.56

Remark：
(1) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

6.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Antenna Connected Construction

The maximum gain of antenna was 2.04 dBi for ANT 1 and -0.84 dBi for ANT 2.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen HTT Technology Co.,Ltd. does not assume any responsibility.

7. Test Setup Photo

Reference to the **appendix I** for details.

8. EUT Constructional Details

Reference to the **appendix II** for details.

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